OIPE JC12 MAY 18 2005

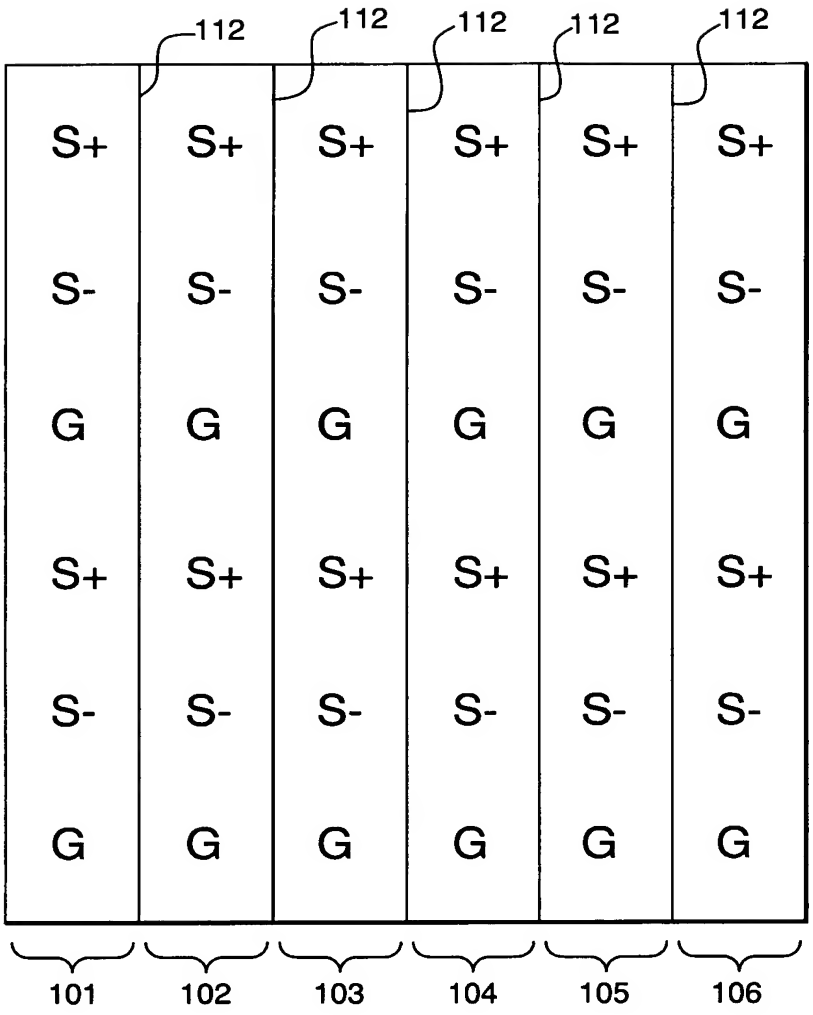

FIG. 1A
(PRIOR ART)

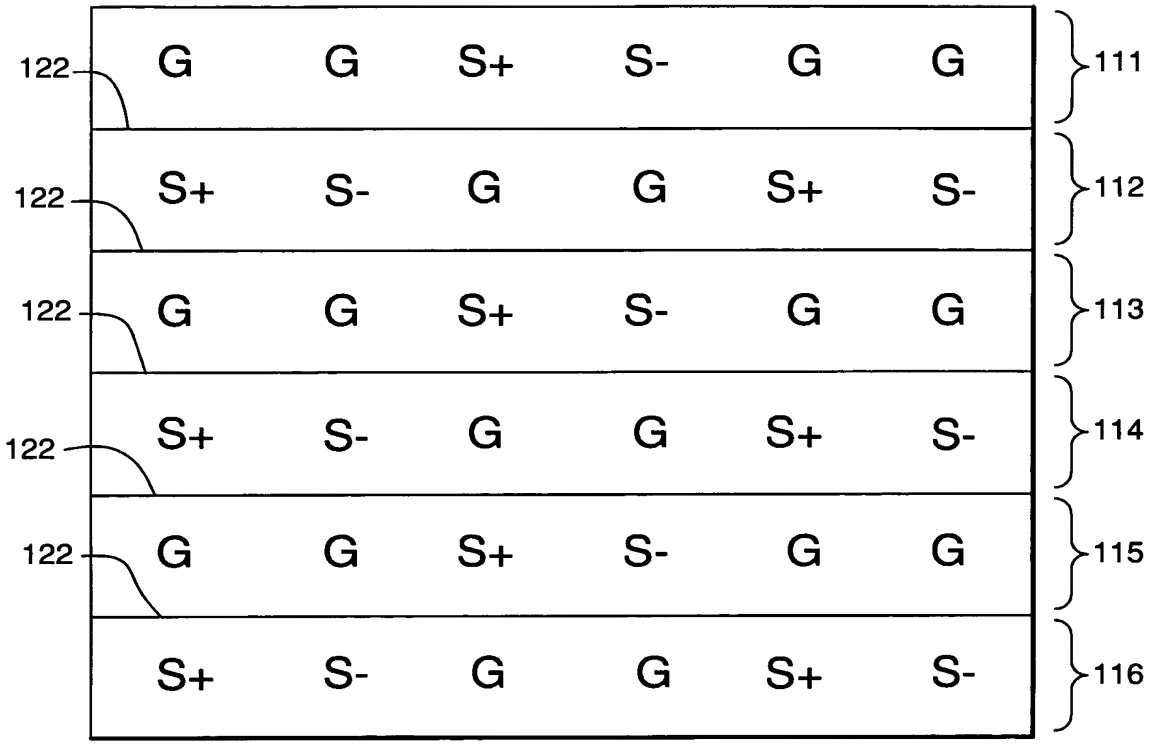

FIG. 1B
(PRIOR ART)

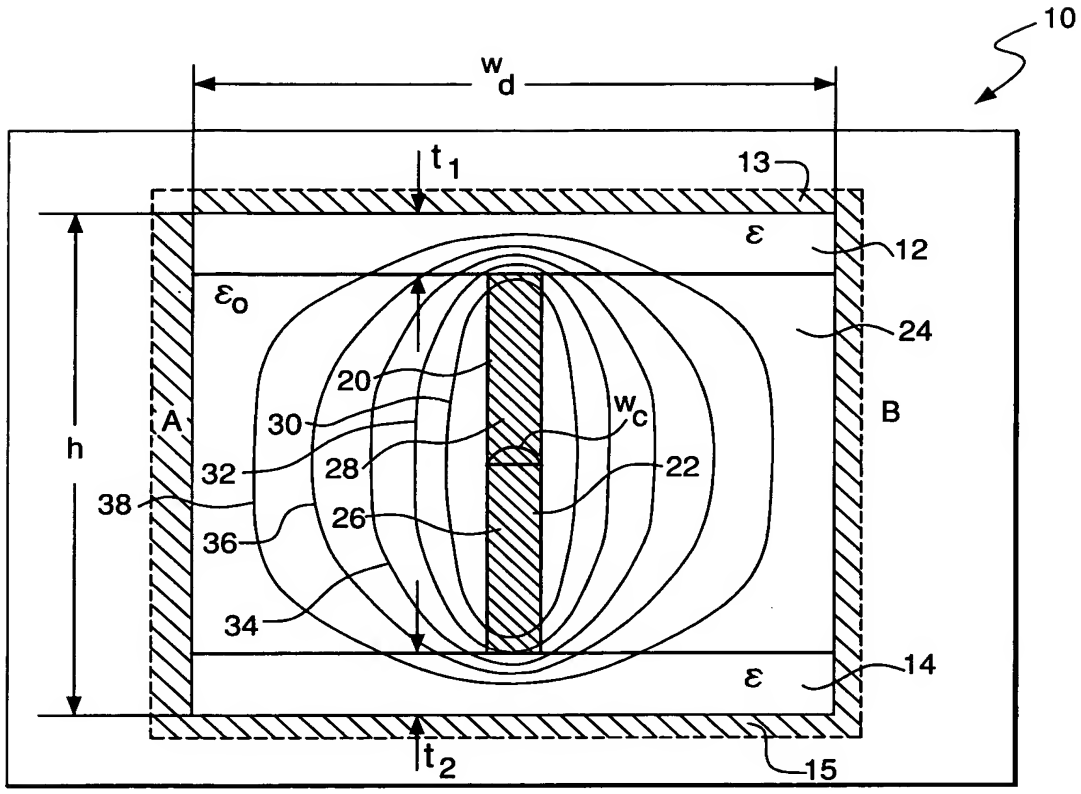
10
w_d
t_1
13
ε
12
ε_o
24
20
w_c
B
A
30
h
32
28
22
38
26
36
34
ε
14
t_2
15

FIG. 2A

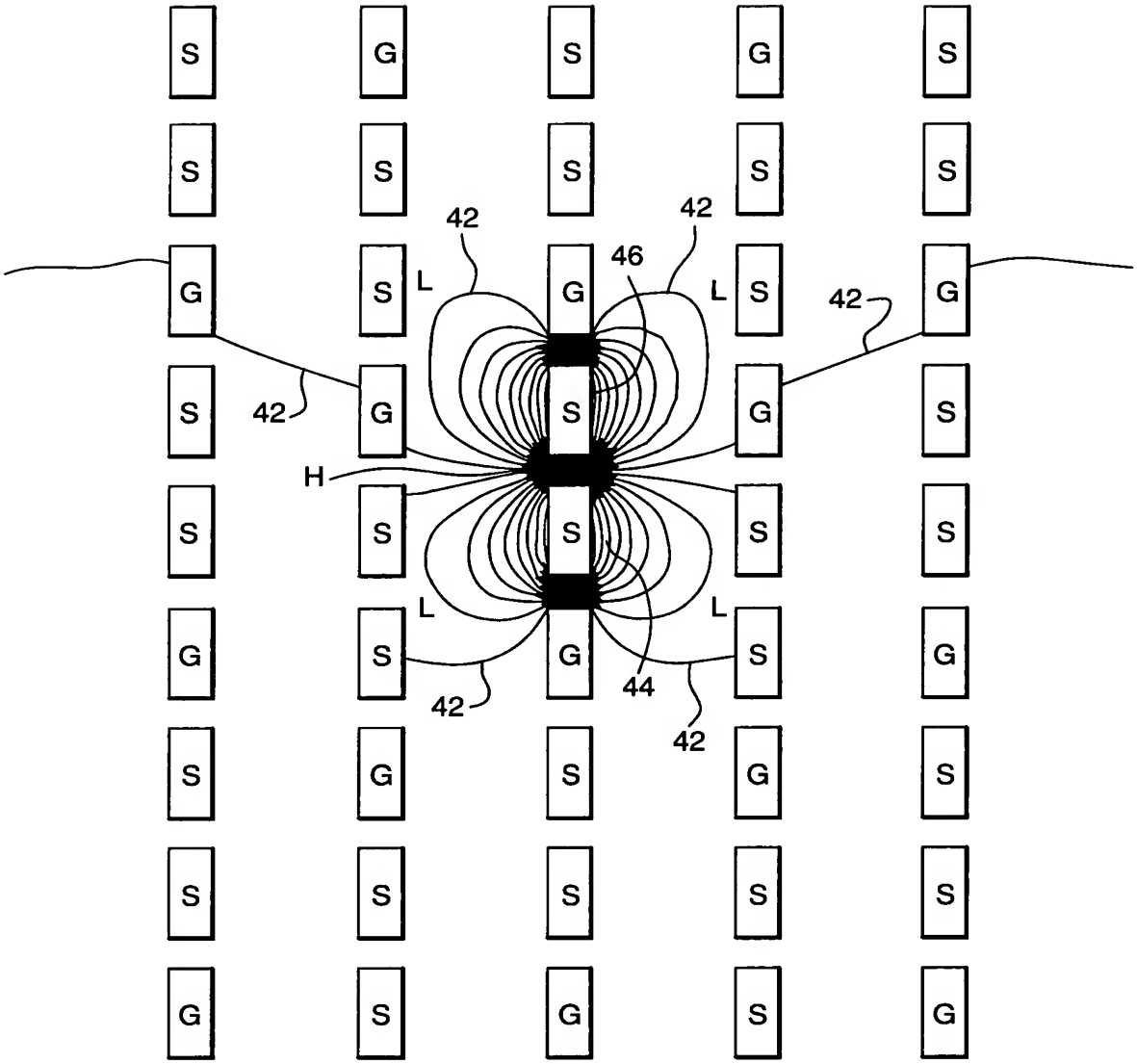

FIG. 2B

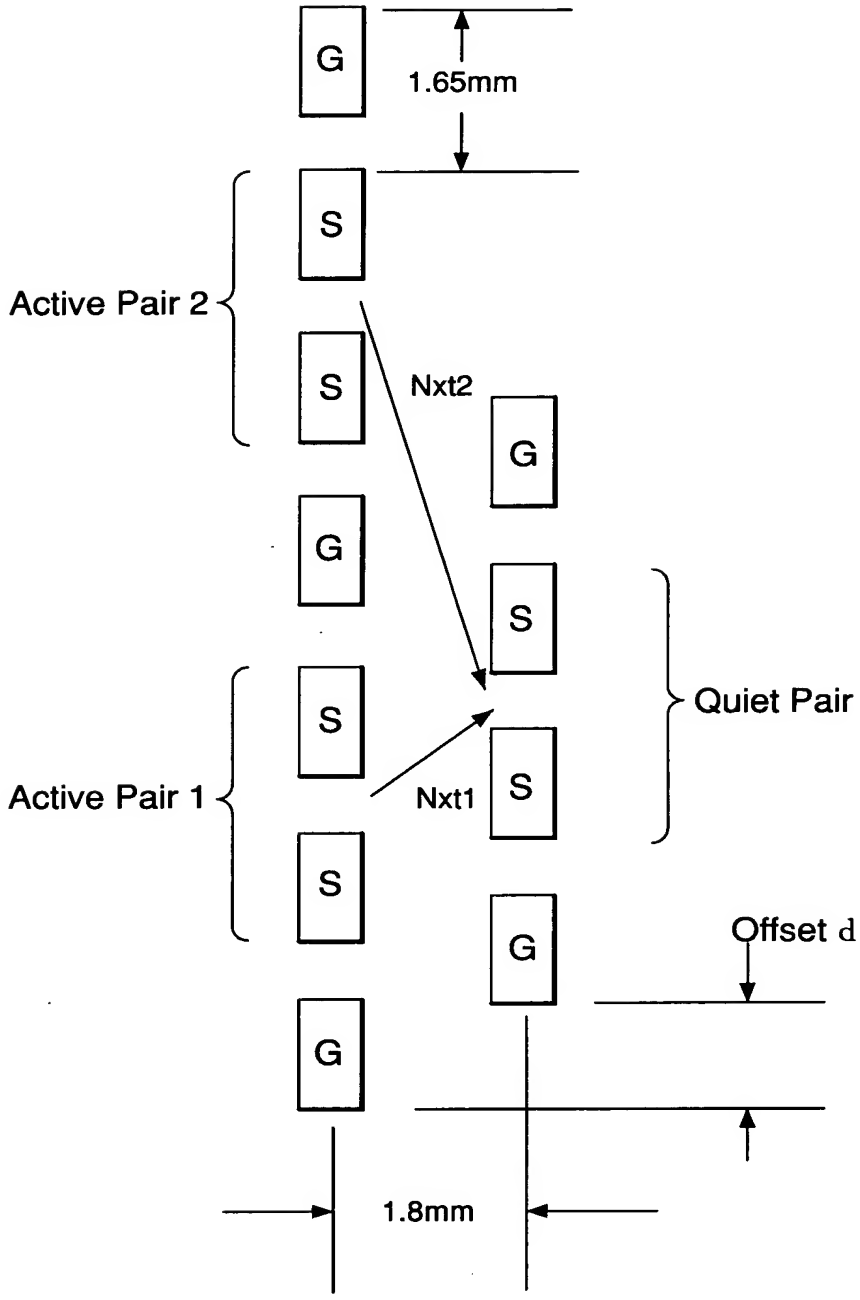
G
1.65mm
S
Active Pair 2
S
Nxt2
G
G
S
Quiet Pair
S
Active Pair 1
Nxt1
S
S
G
Offset d
G
1.8mm

FIG. 3A

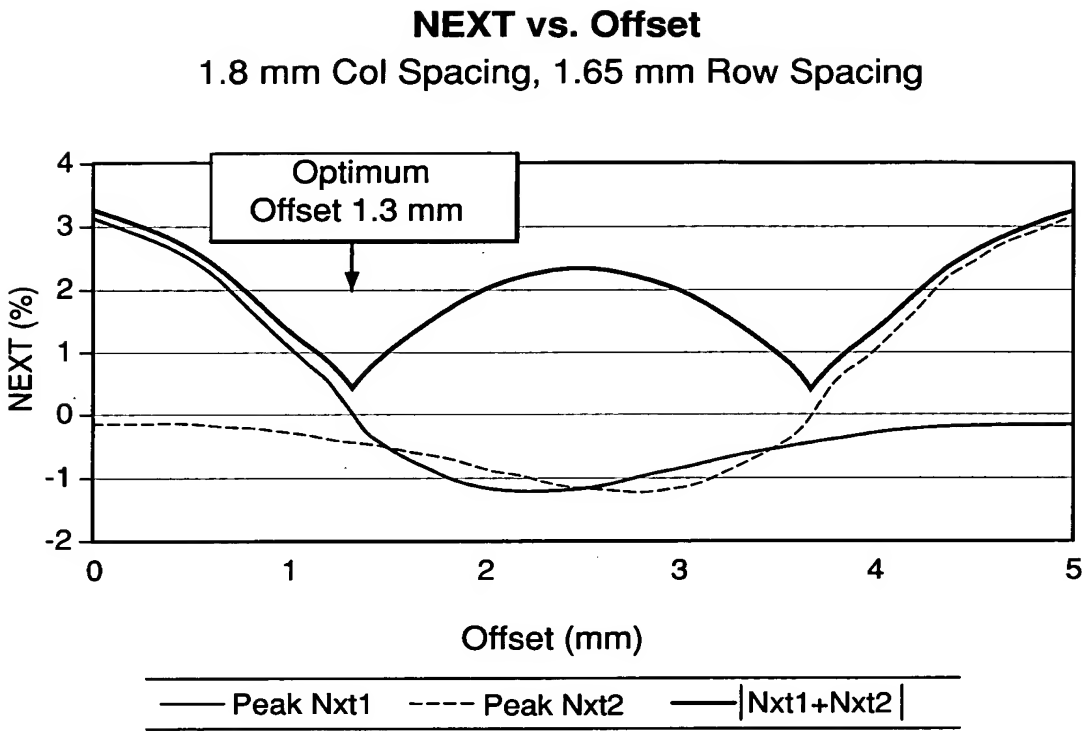
NEXT vs. Offset
1.8 mm Col Spacing, 1.65 mm Row Spacing
Optimum
Offset 1.3 mm
NEXT (%)
4
3
2
1
0
-1
-2
0
1
2
3
4
5
Offset (mm)
Peak Nxt1
Peak Nxt2
|Nxt1+Nxt2|

FIG. 3B

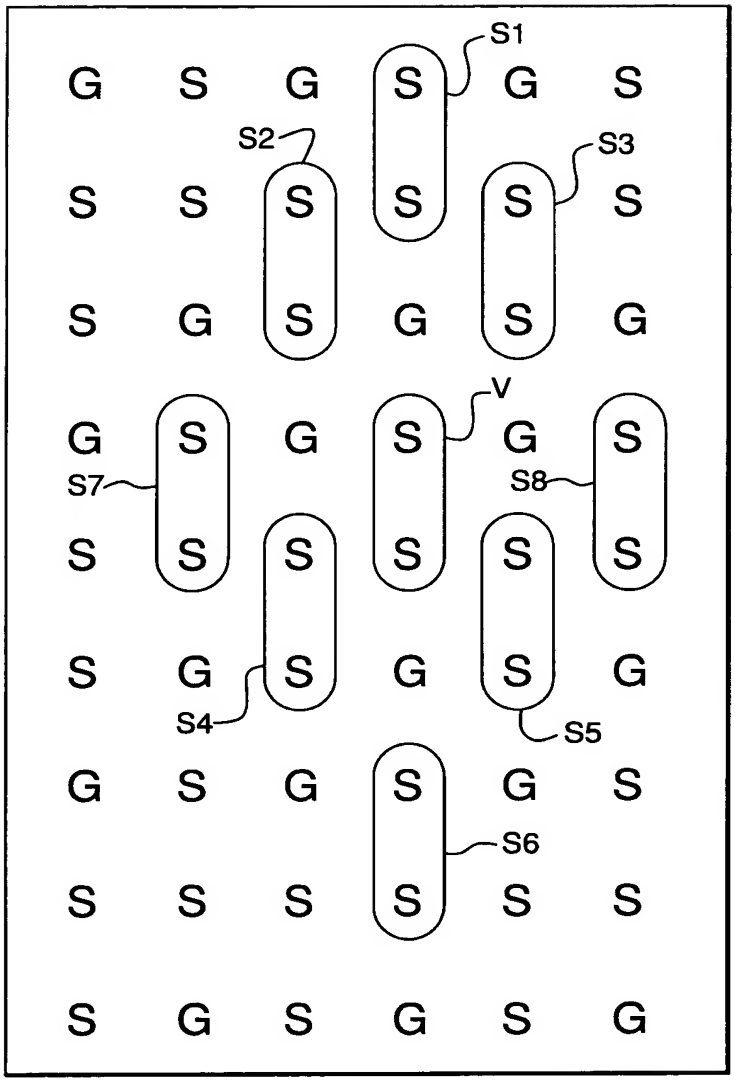

FIG. 3C

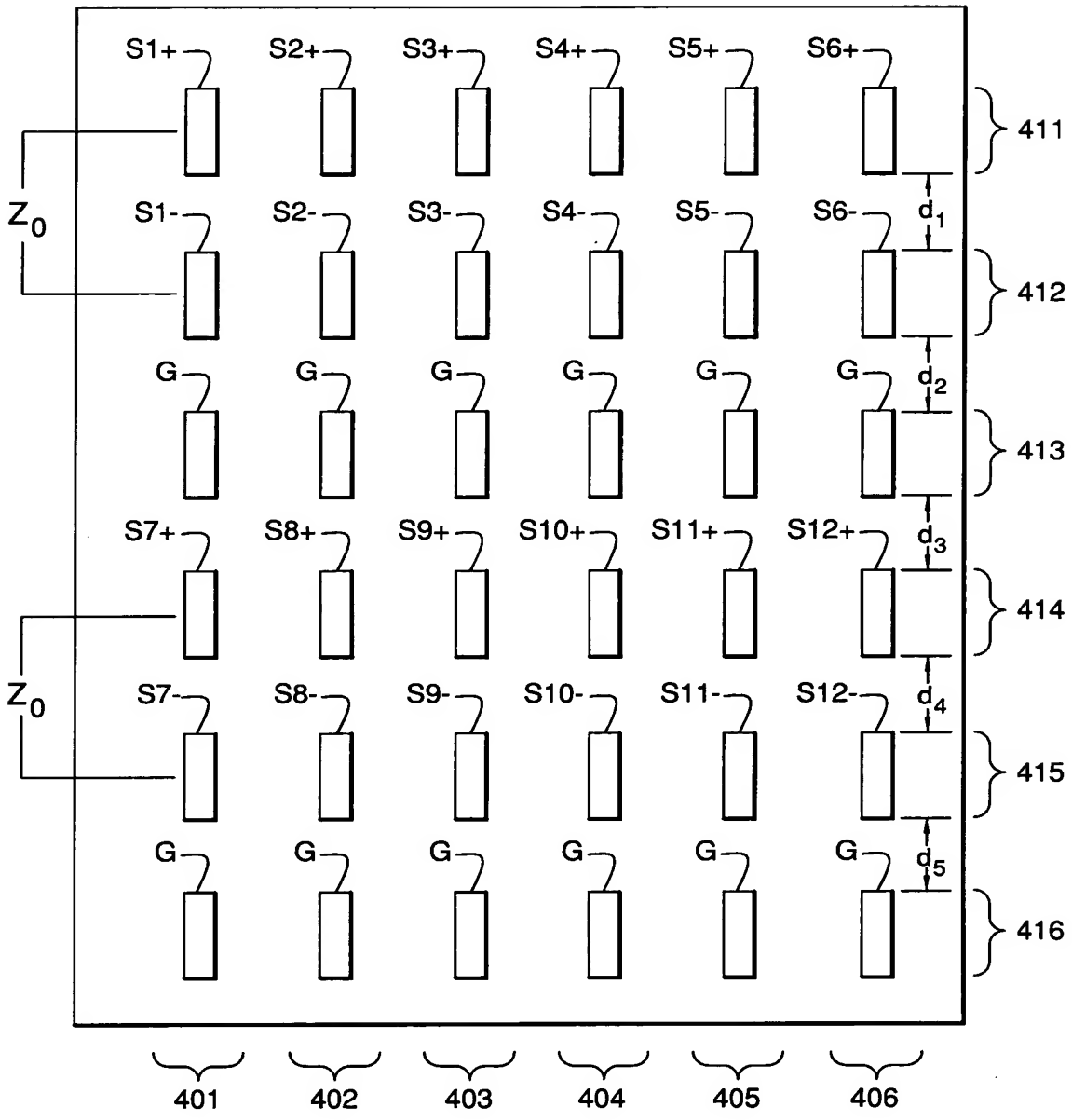
S1+
S2+
S3+
S4+
S5+
S6+
411
Z_0
S1-
S2-
S3-
S4-
S5-
S6-
d_1
412
G
d_2
413
S7+
S8+
S9+
S10+
S11+
S12+
d_3
414
Z_0
S7-
S8-
S9-
S10-
S11-
S12-
d_4
415
d_5
416
401
402
403
404
405
406

FIG. 4A

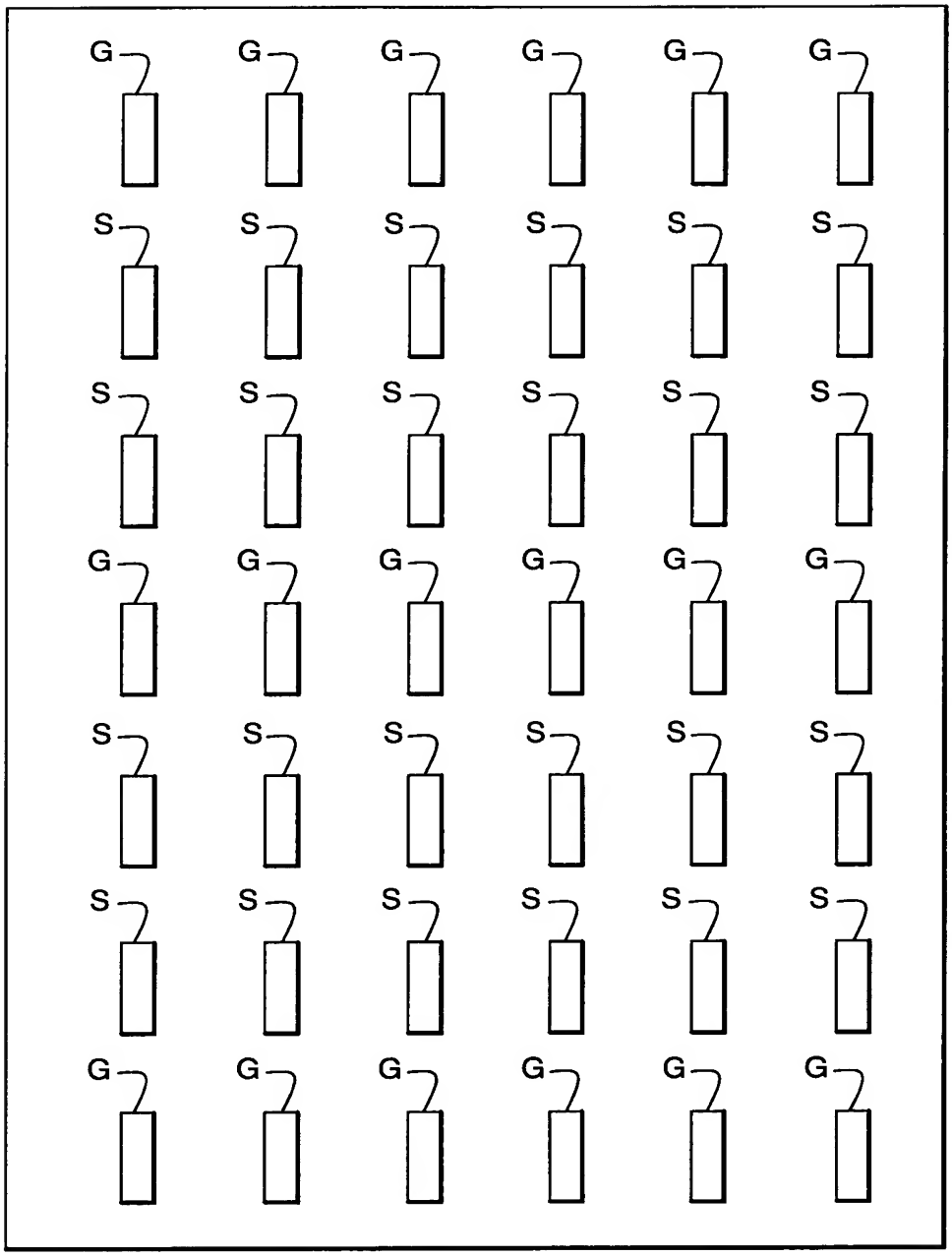

FIG. 4B

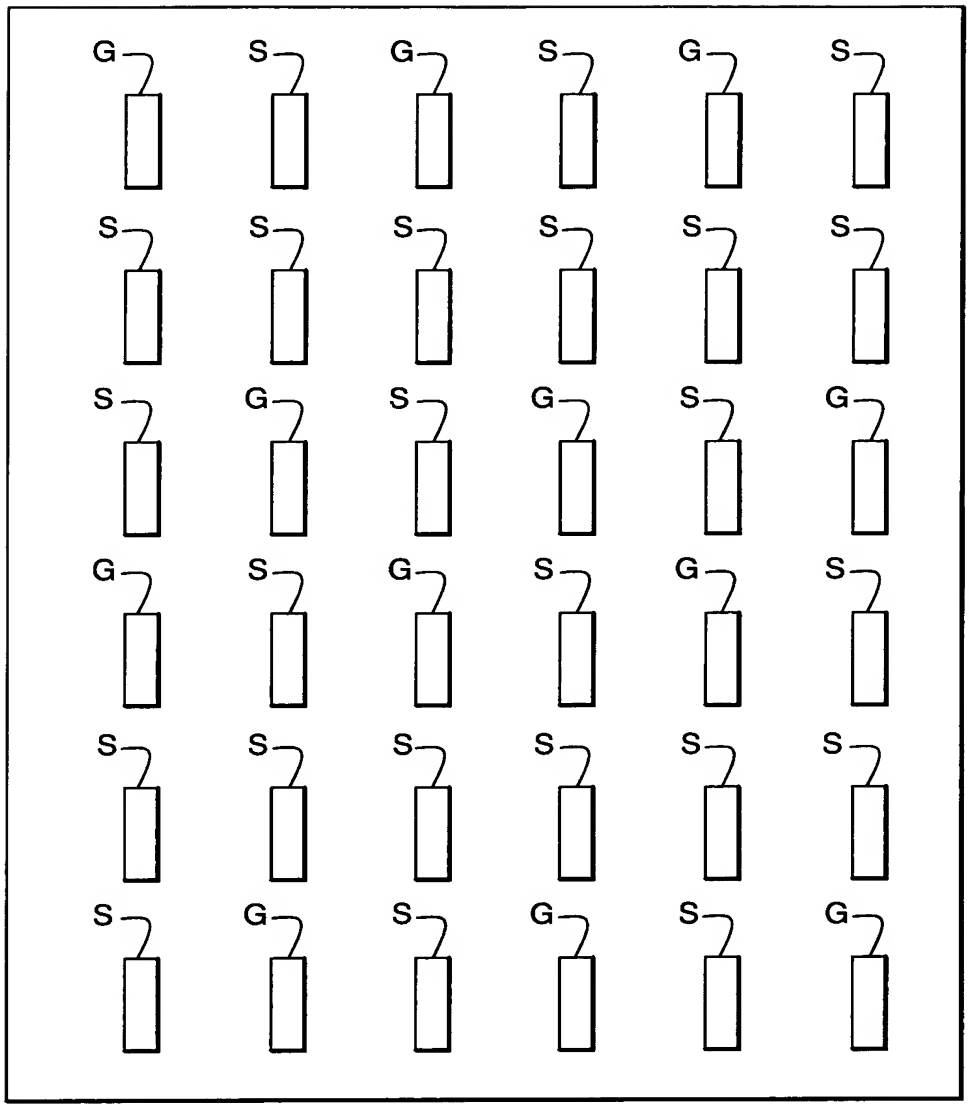

FIG. 4C

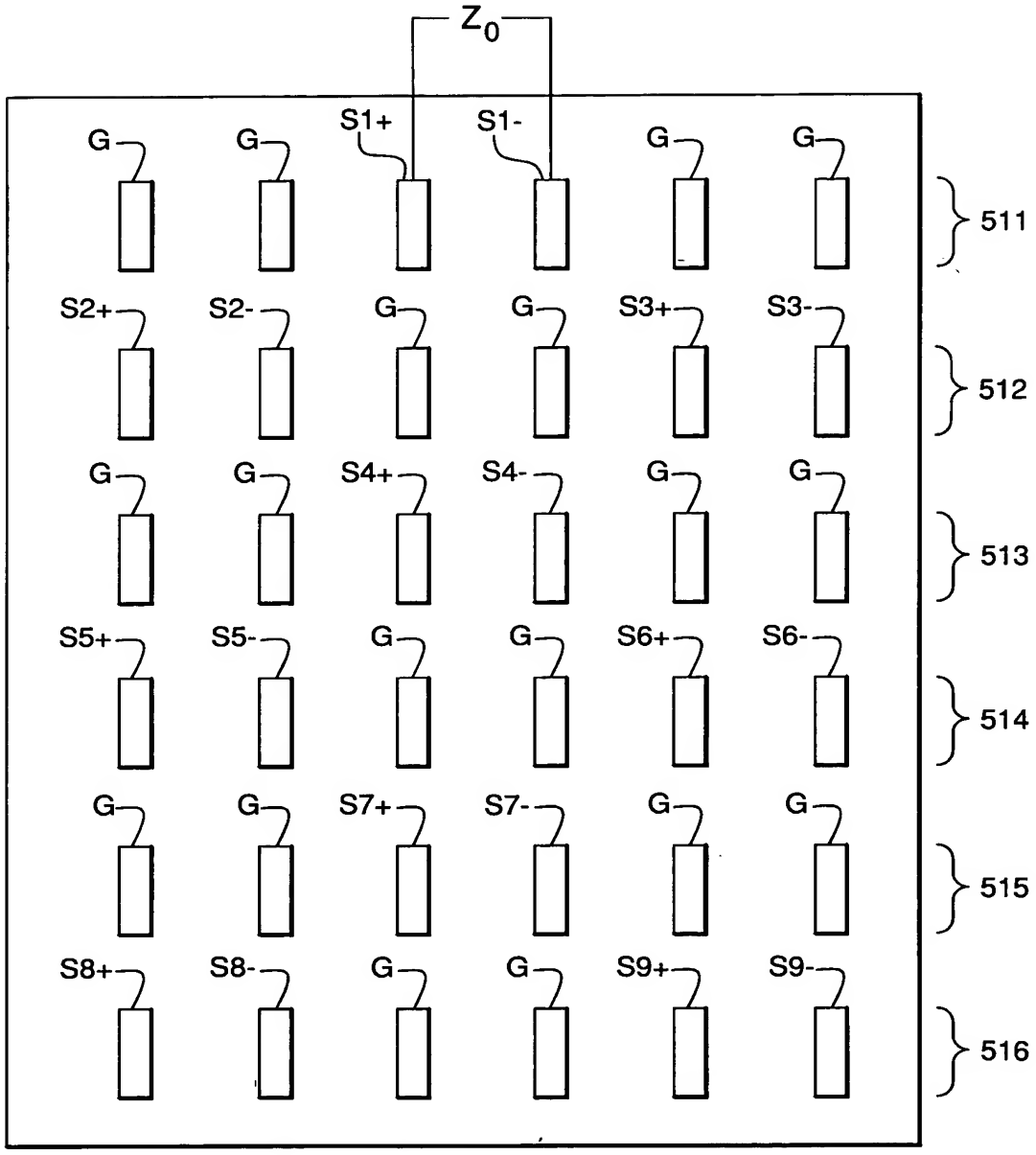
Z_0
G
S1+
S1-
511
S2+
S2-
S3+
S3-
512
S4+
S4-
513
S5+
S5-
S6+
S6-
514
S7+
S7-
515
S8+
S8-
S9+
S9-
516

FIG. 5

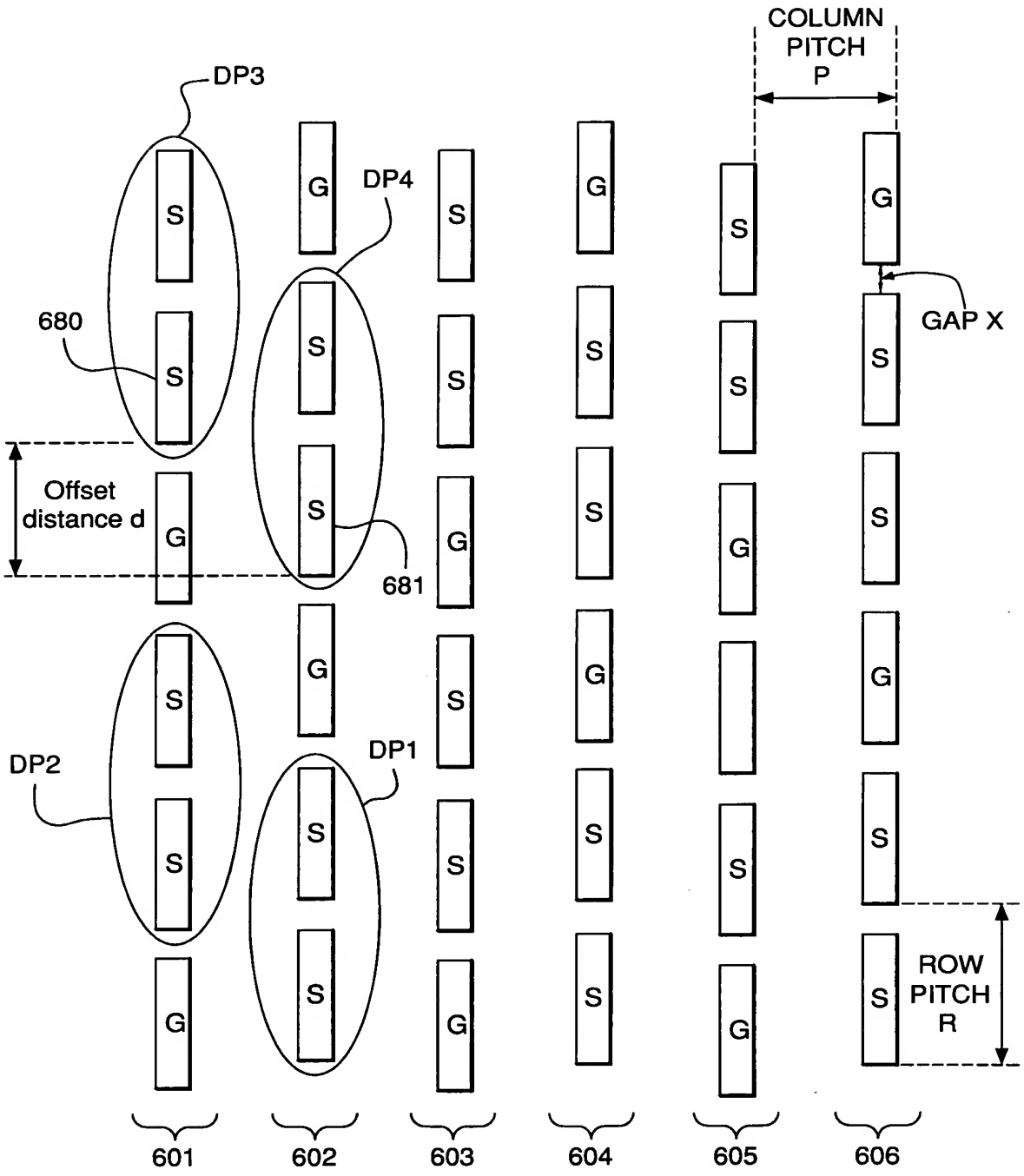
COLUMN
PITCH
P
DP3
DP4
680
GAP X
Offset
distance d
681
DP2
DP1
ROW
PITCH
R
S
G
601
602
603
604
605
606

FIG. 6

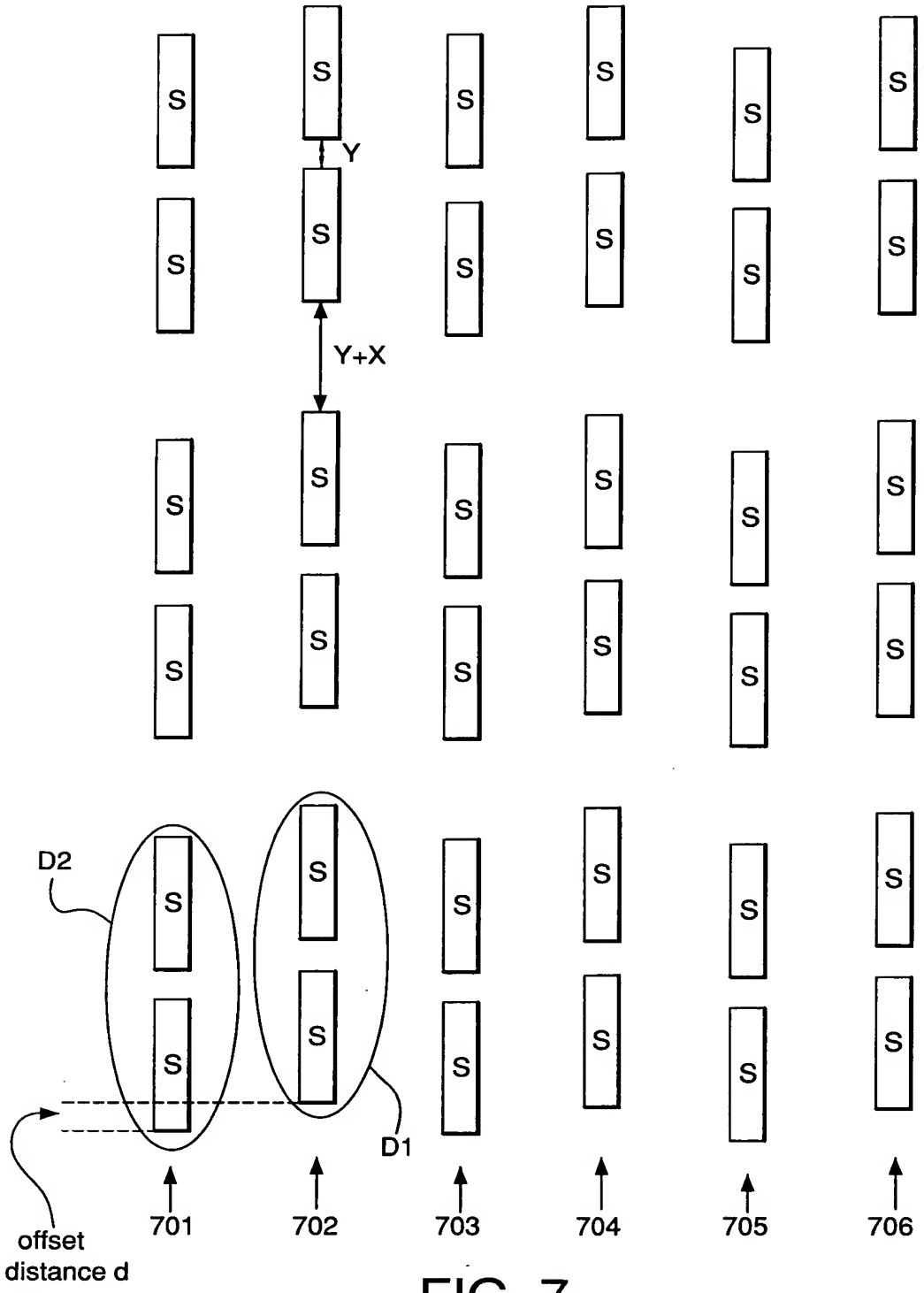

FIG. 7

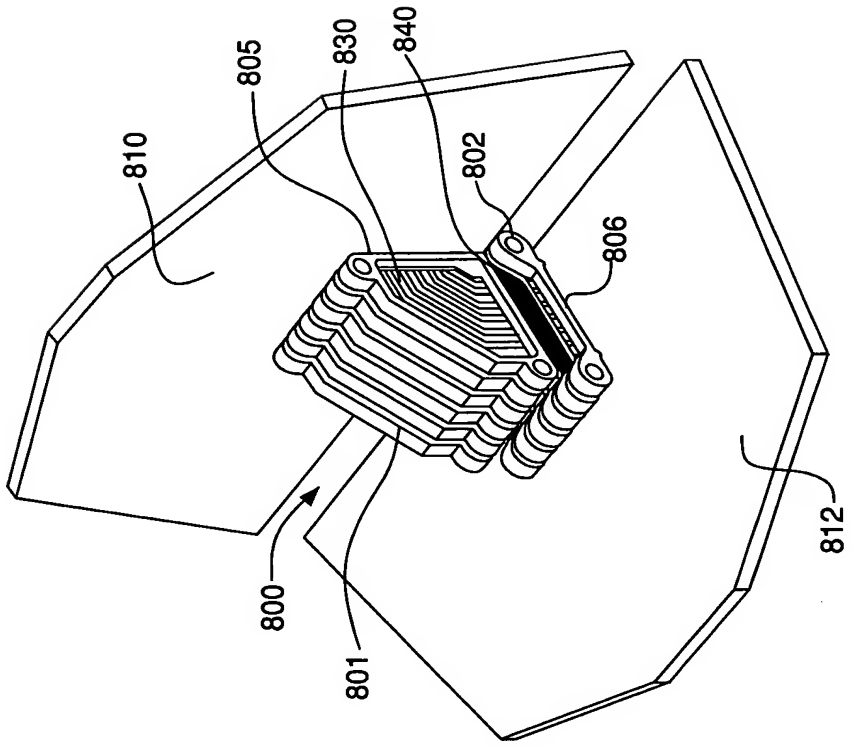

FIG. 8

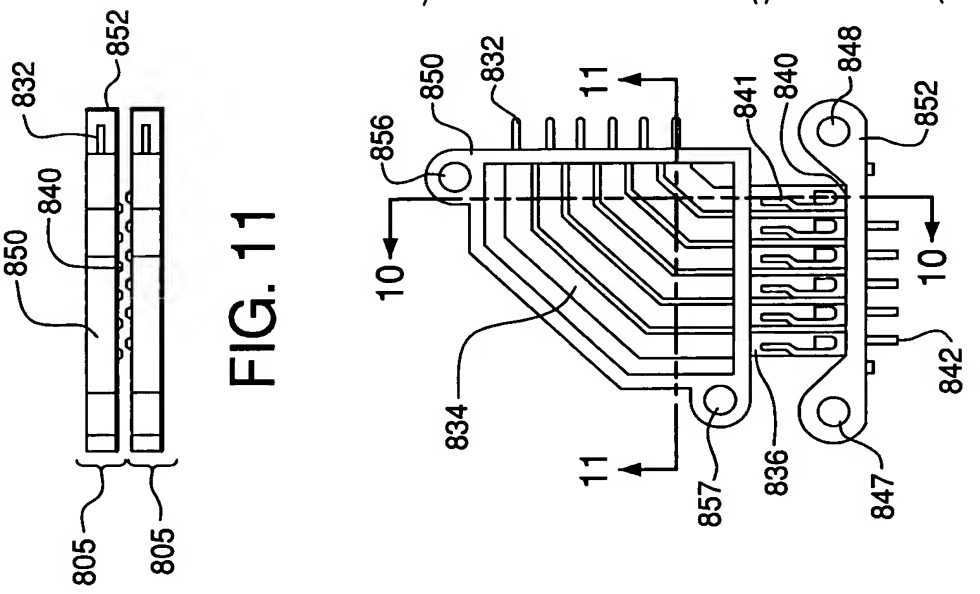

FIG. 9

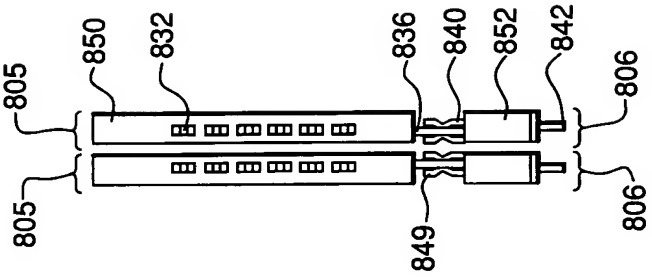

FIG. 10

FIG. 11

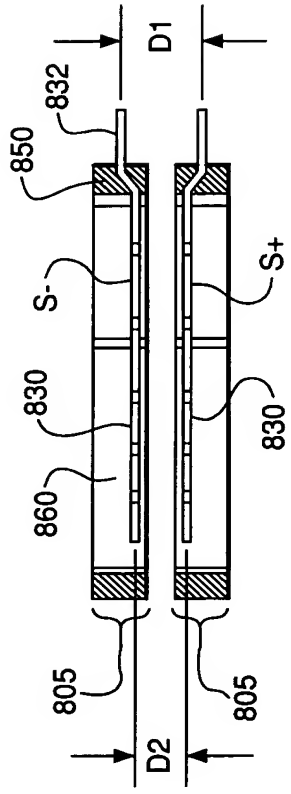

FIG. 12

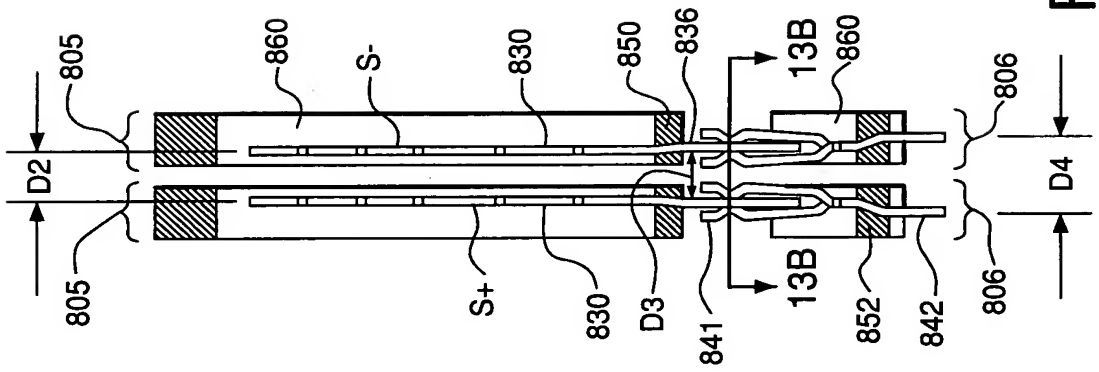

FIG. 13A

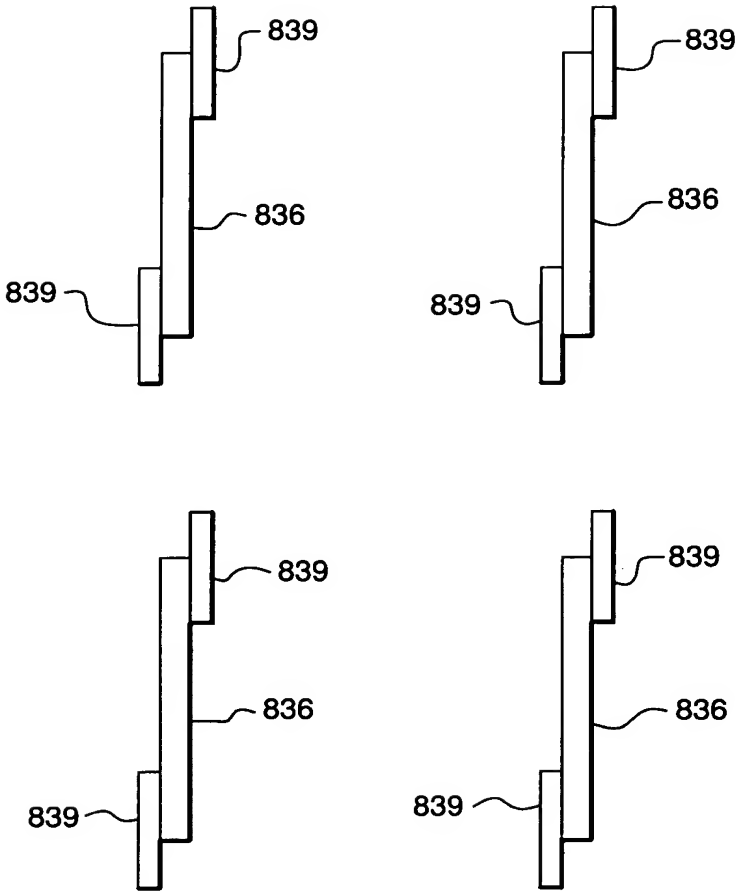

FIG. 13B

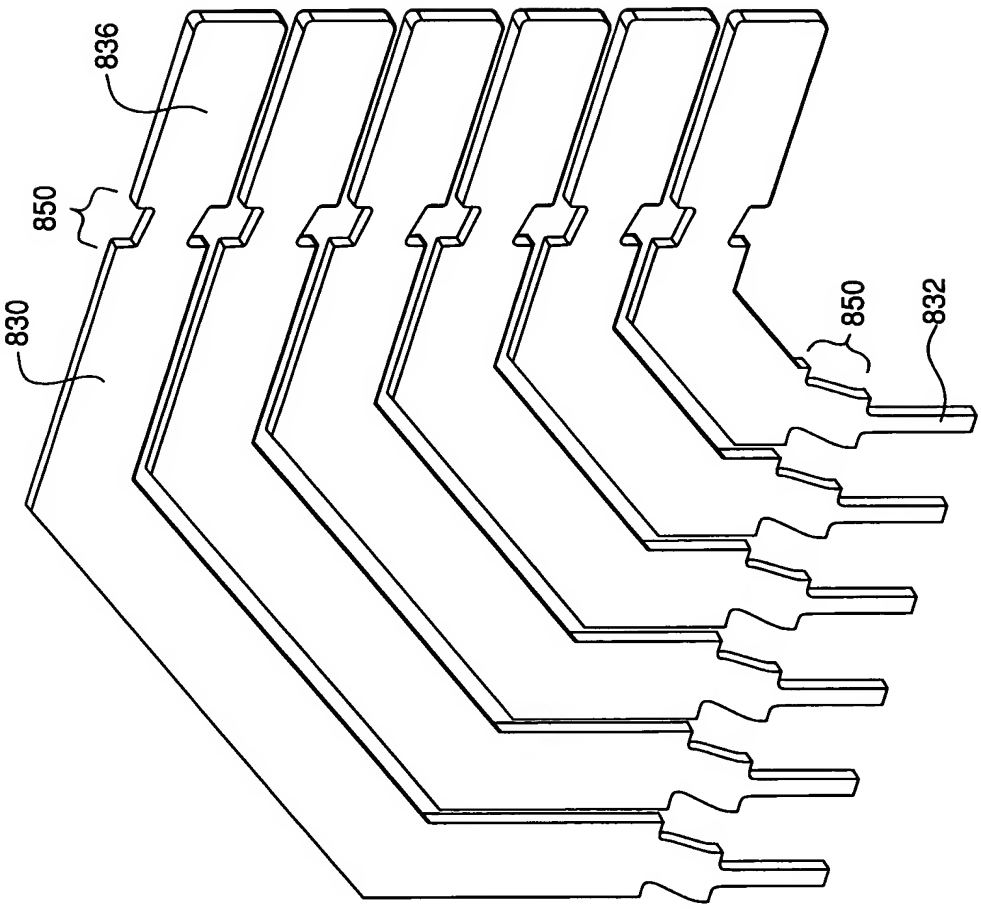

FIG. 14

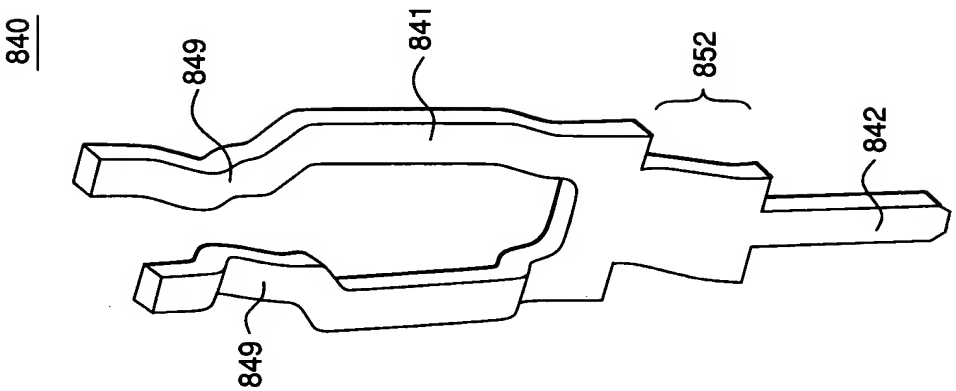

FIG. 15

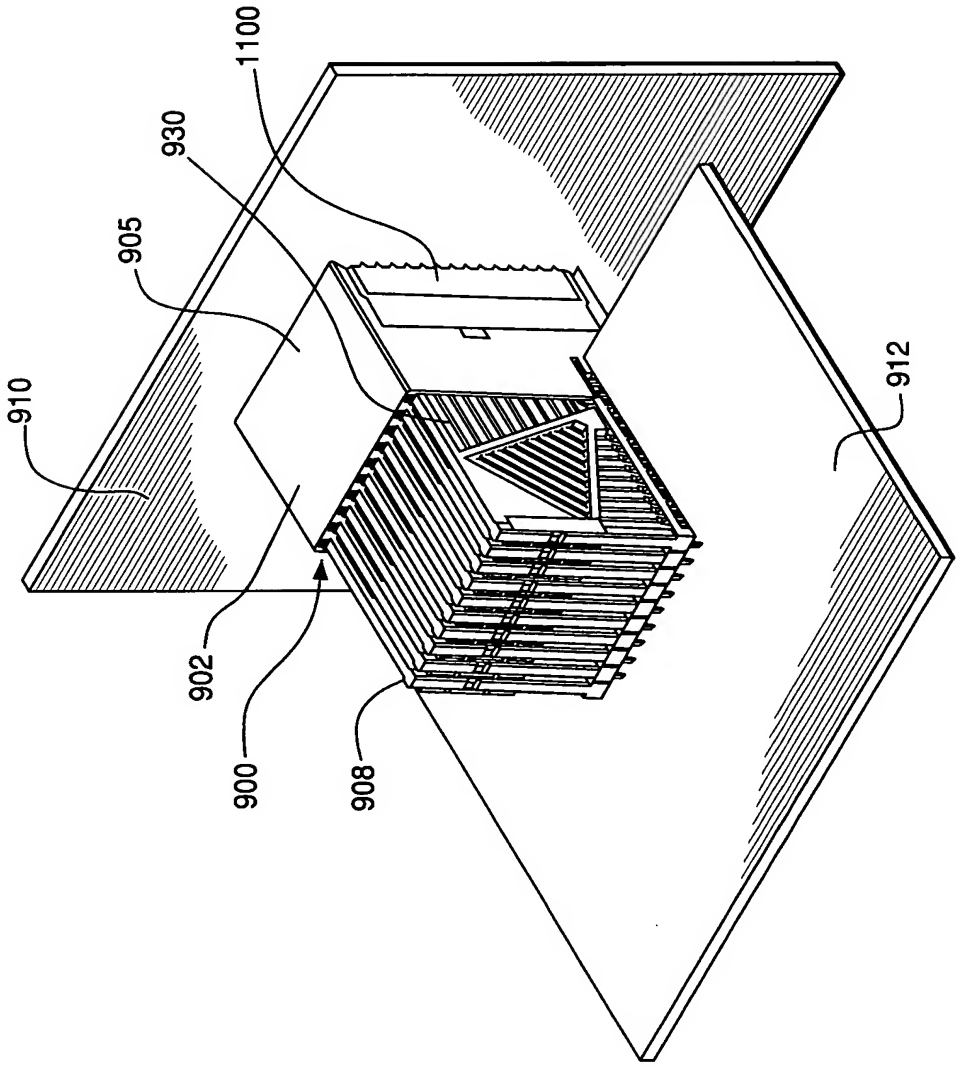

FIG. 16A

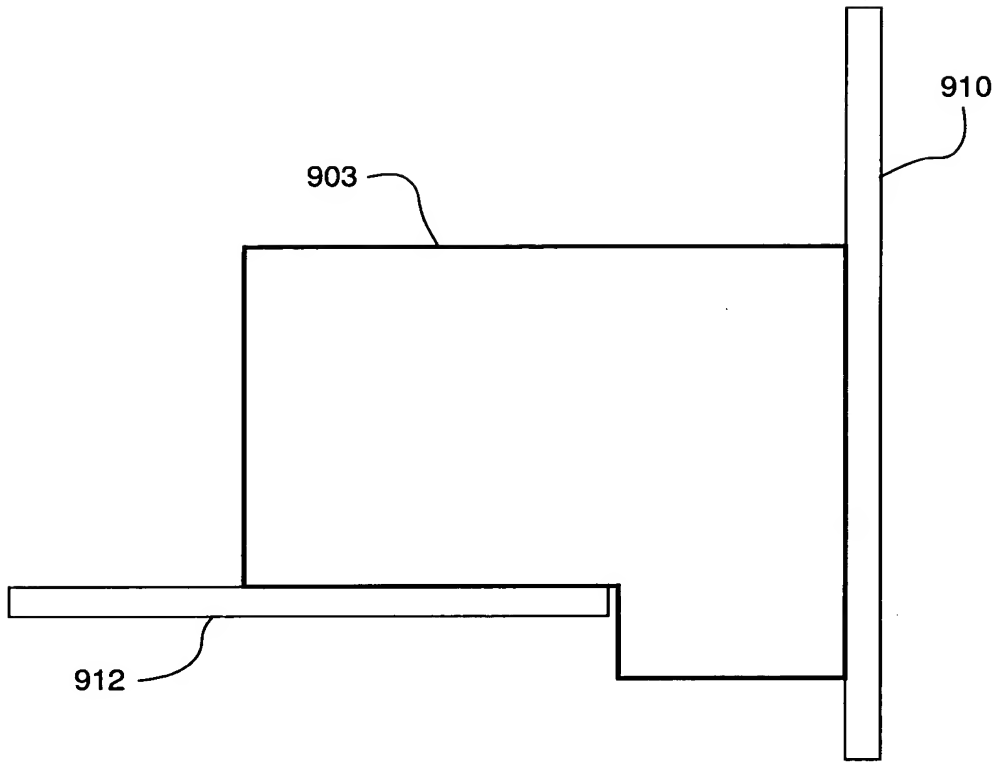

FIG. 16B

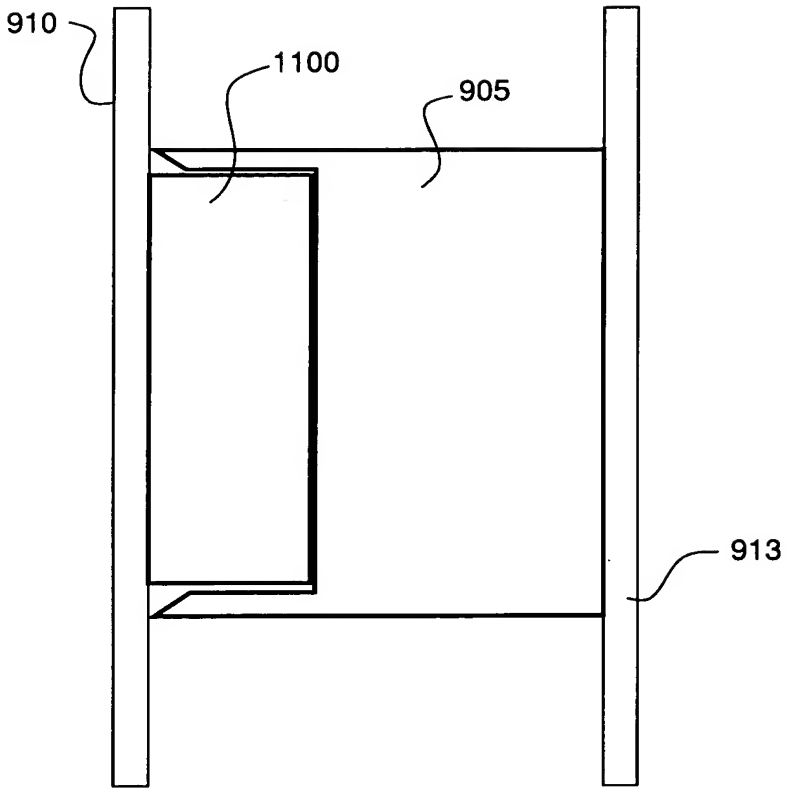

FIG. 16C

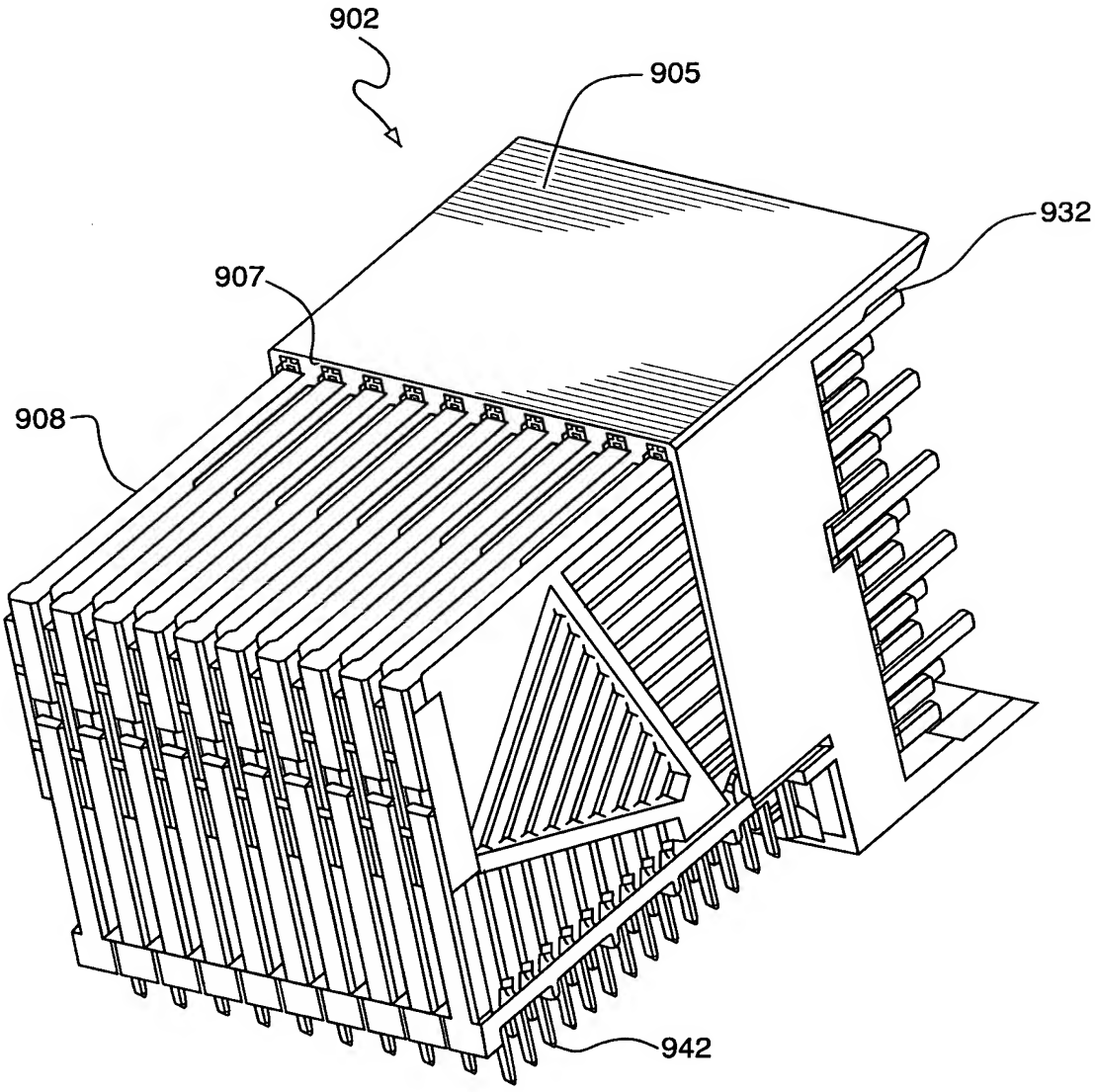

FIG. 17

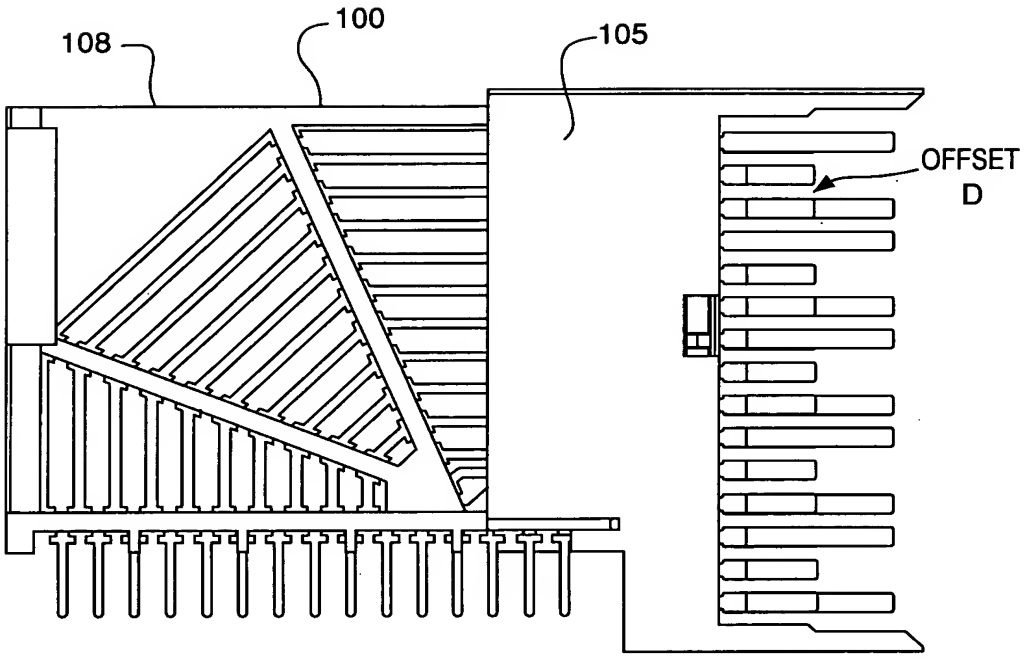

FIG. 18

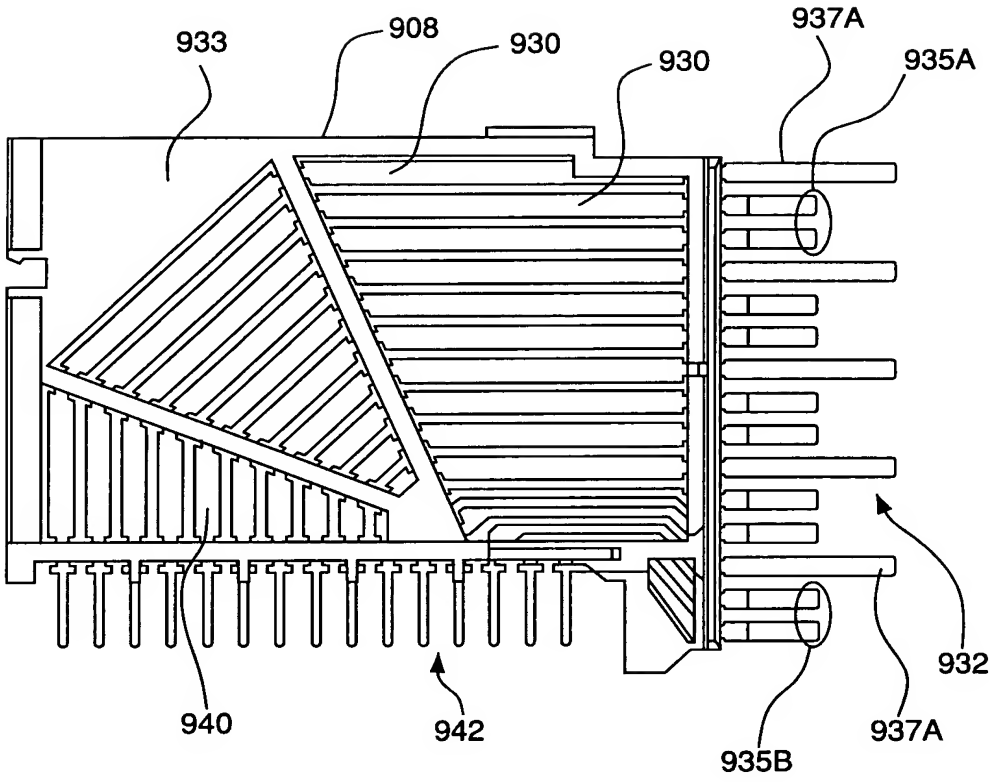

FIG. 19A

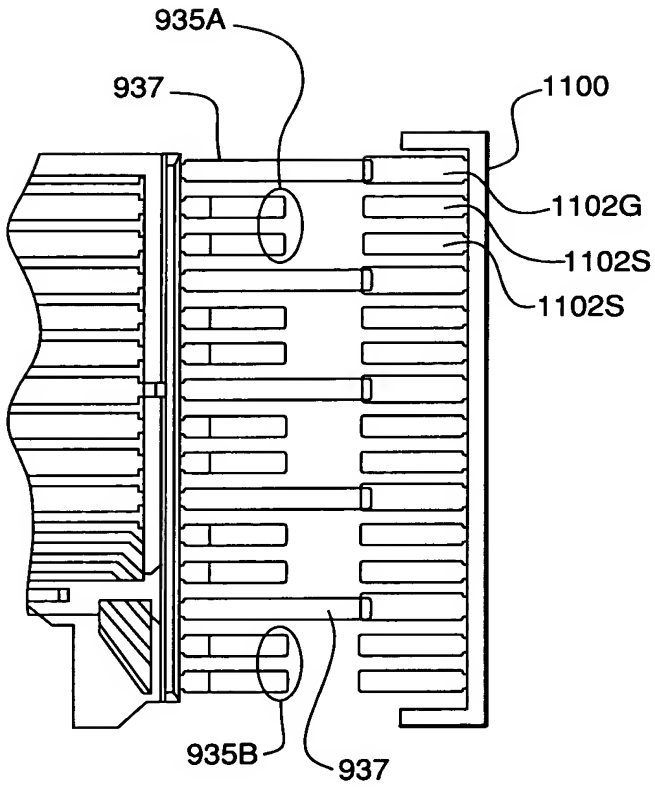

FIG. 19B

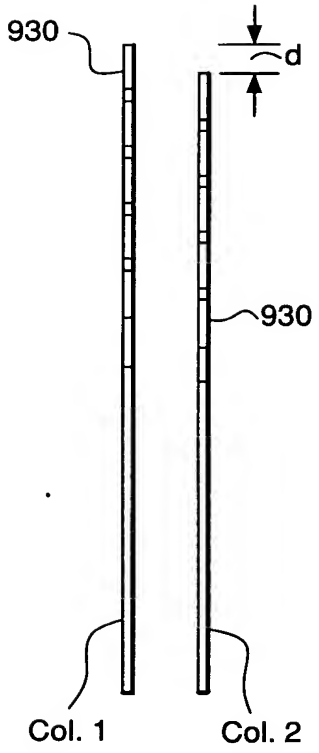

FIG. 20

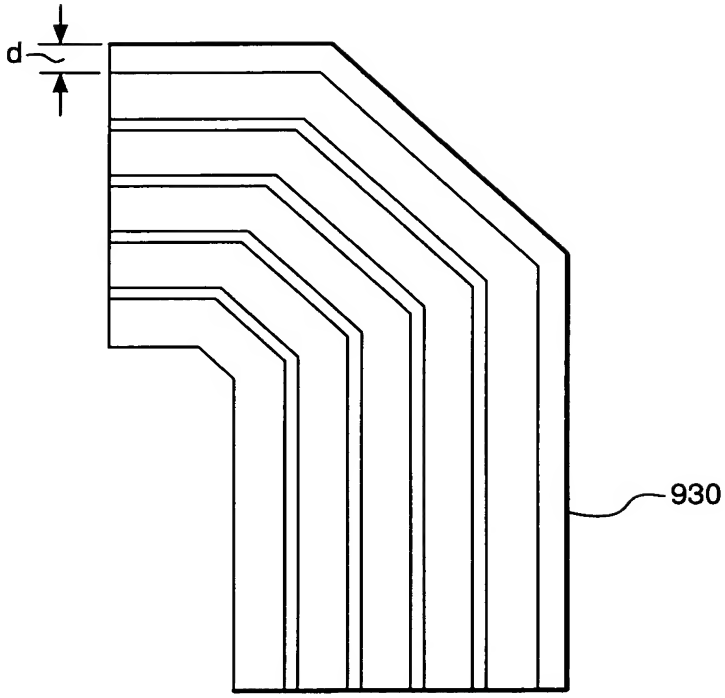

FIG. 21

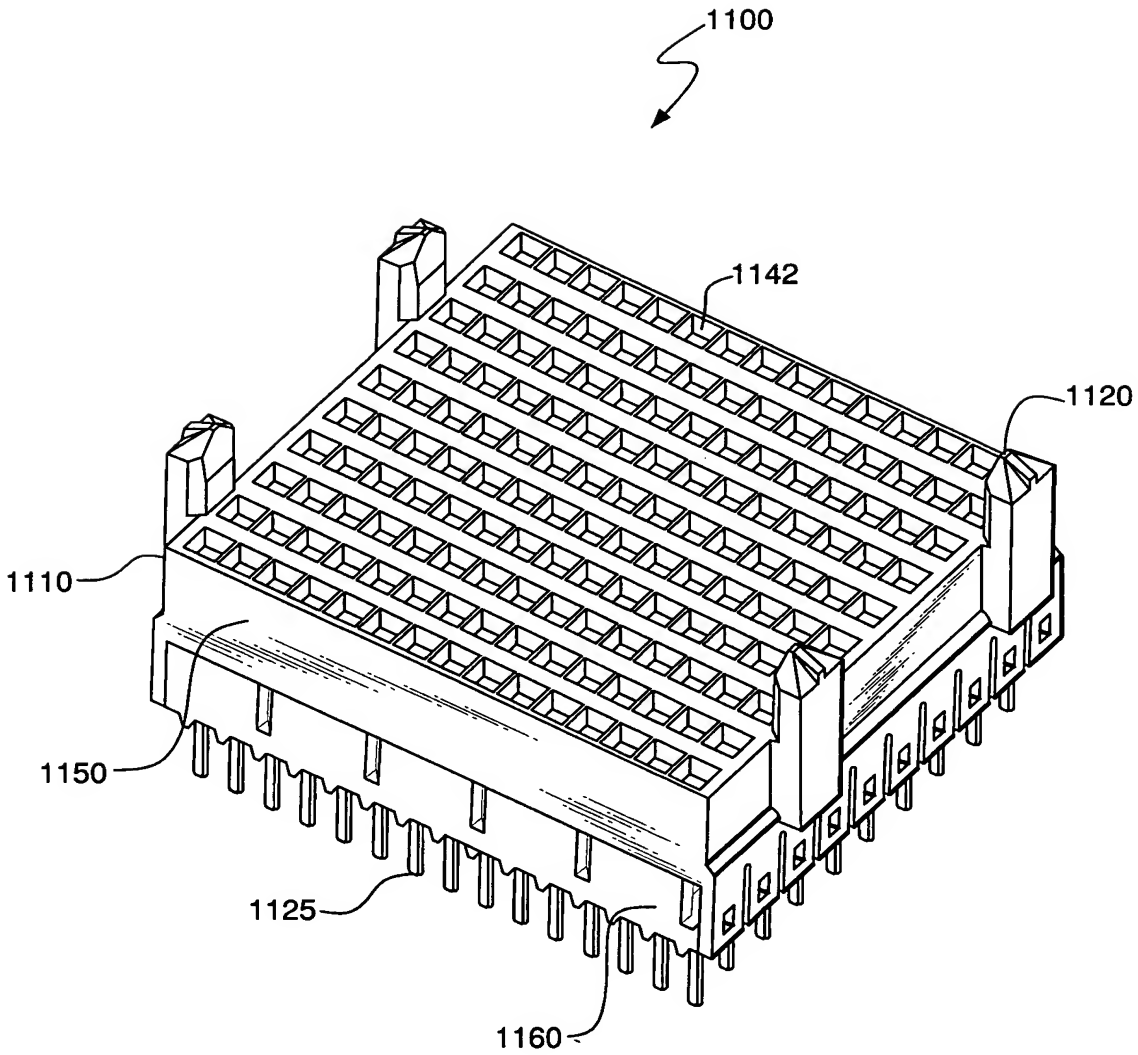

FIG. 22

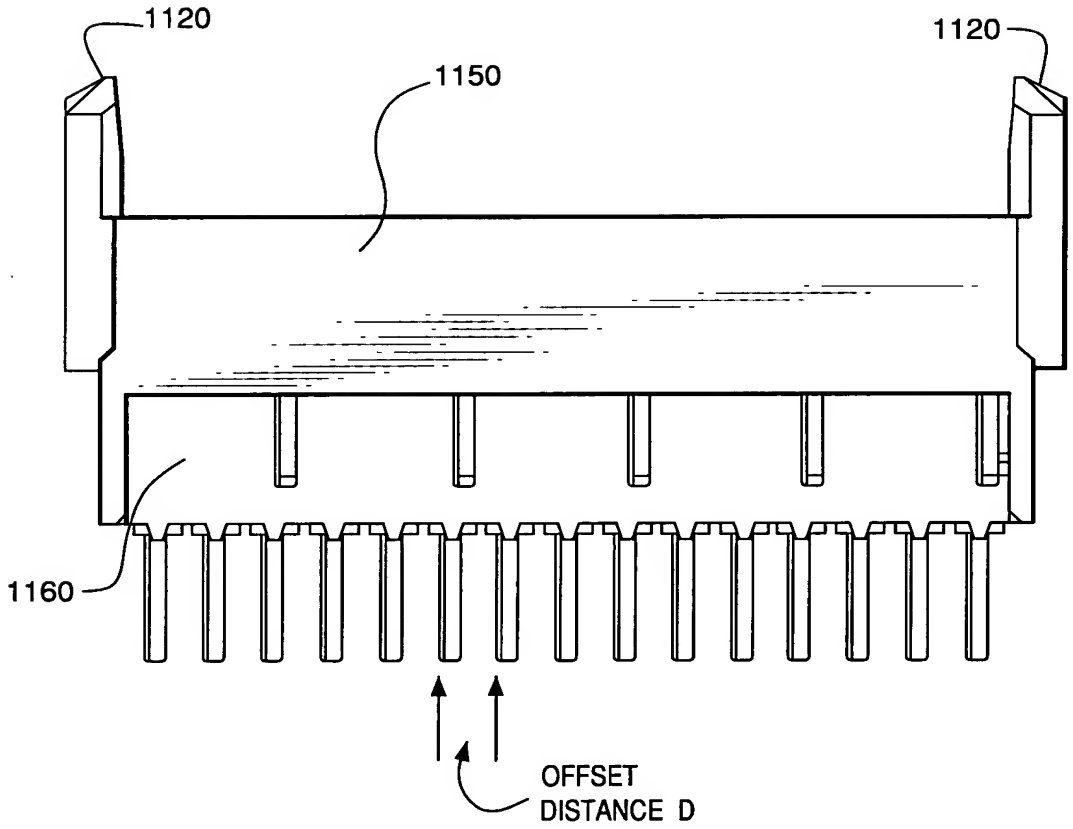

FIG. 23

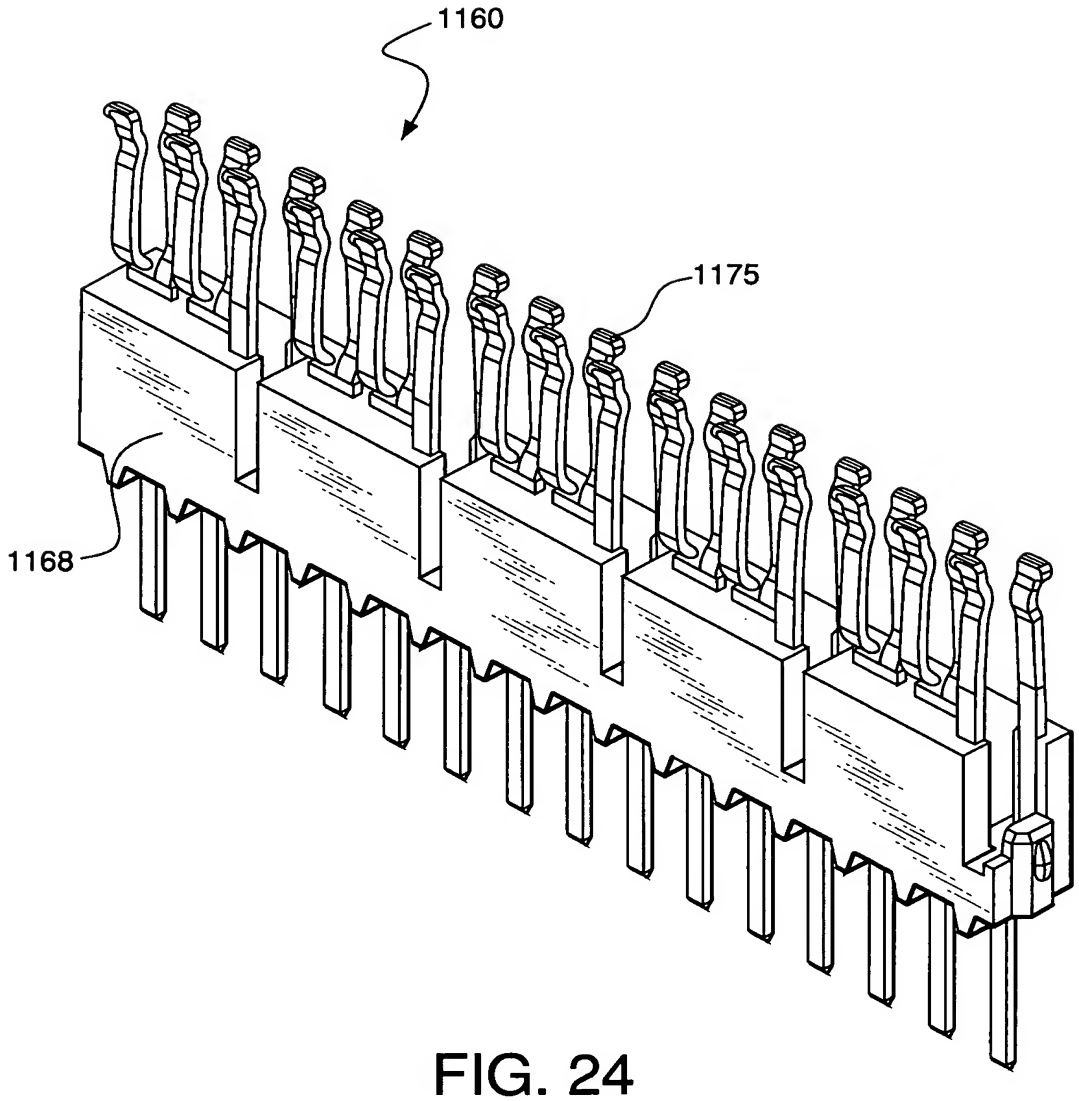

FIG. 24

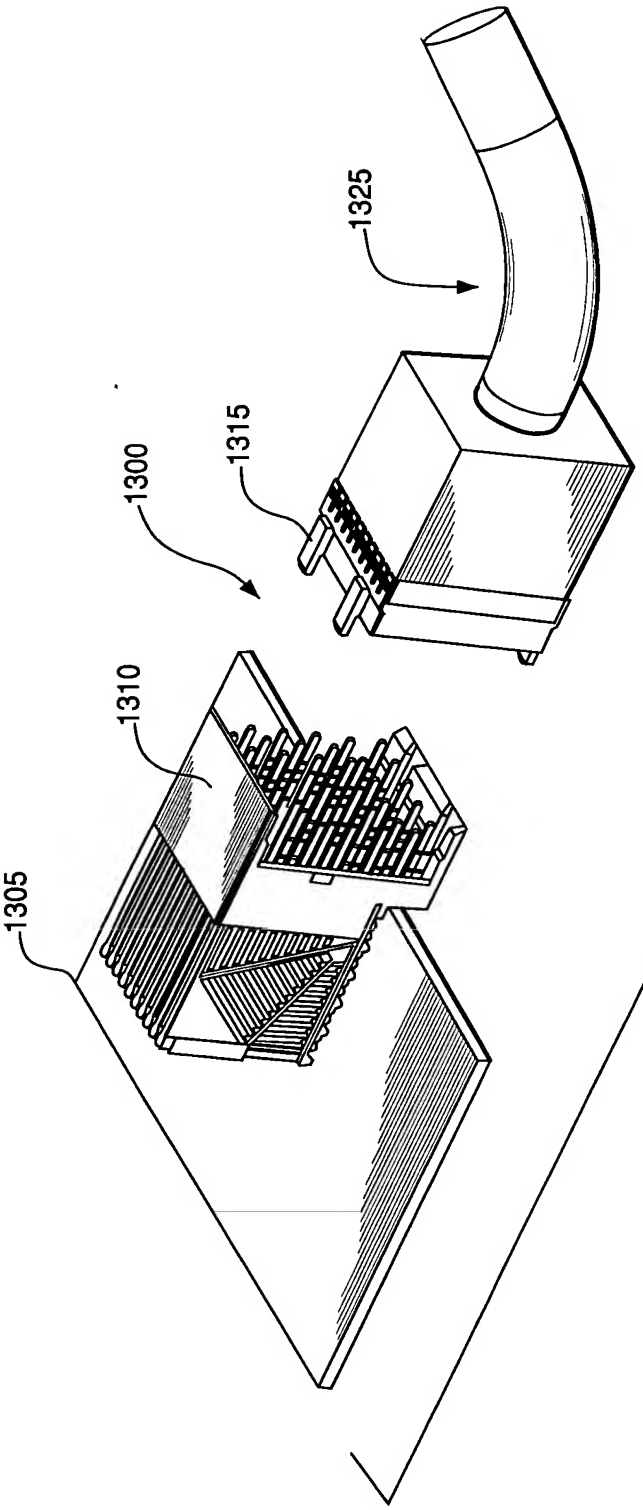

FIG. 25

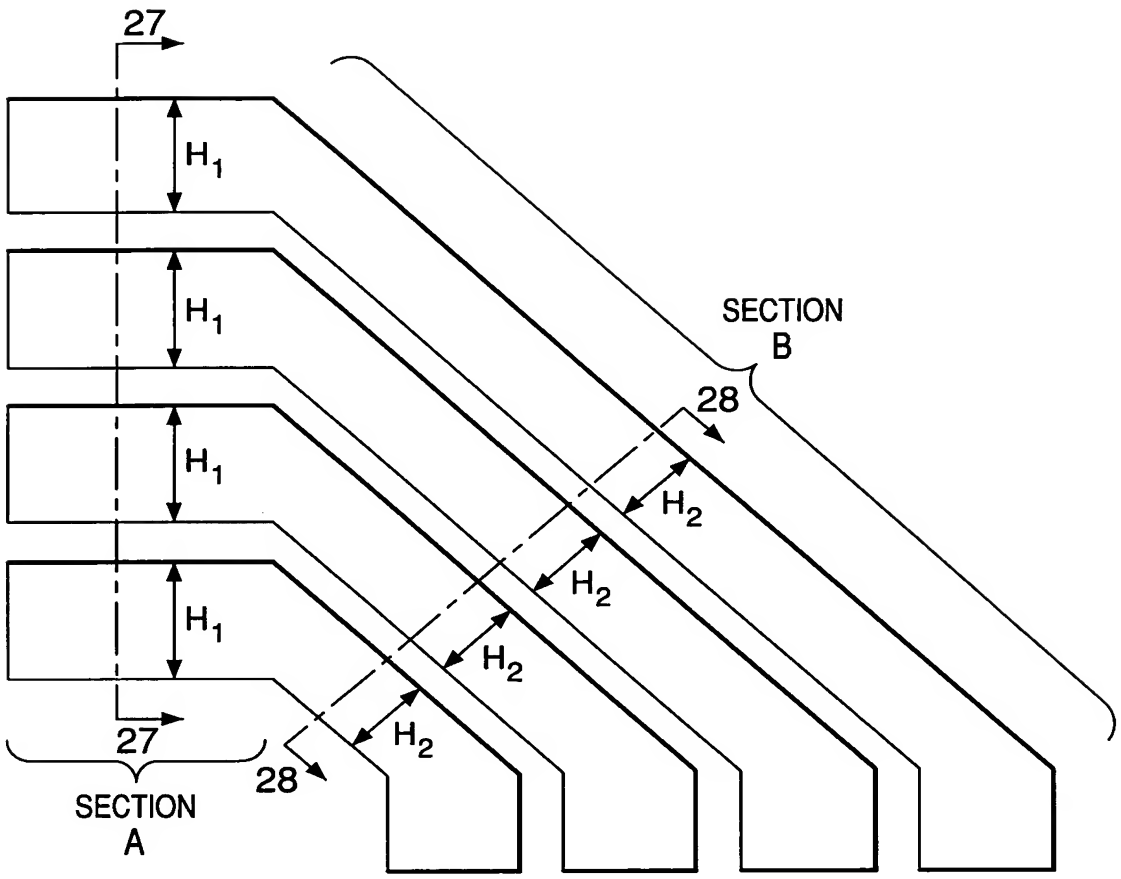

FIG. 26

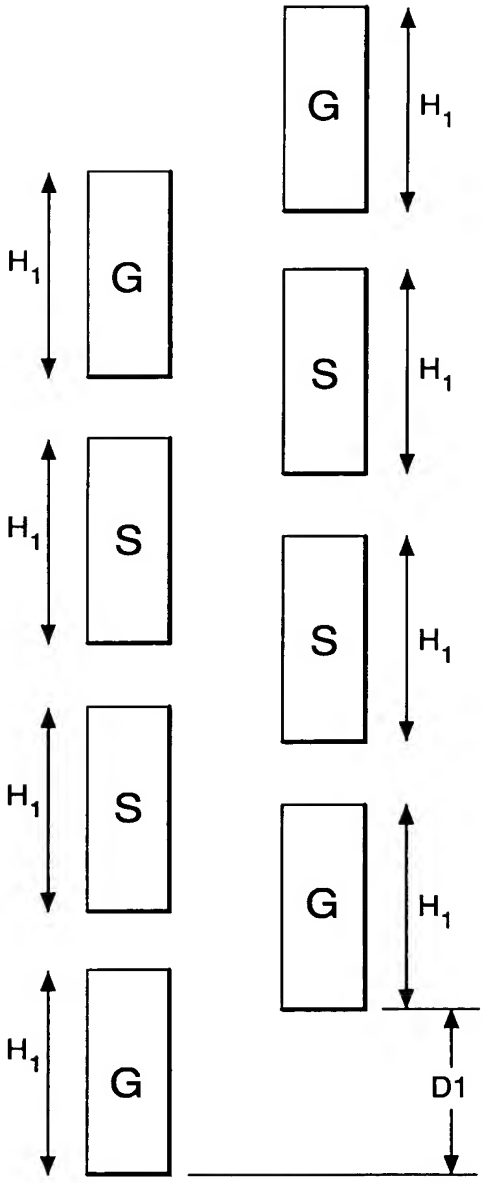

FIG. 27

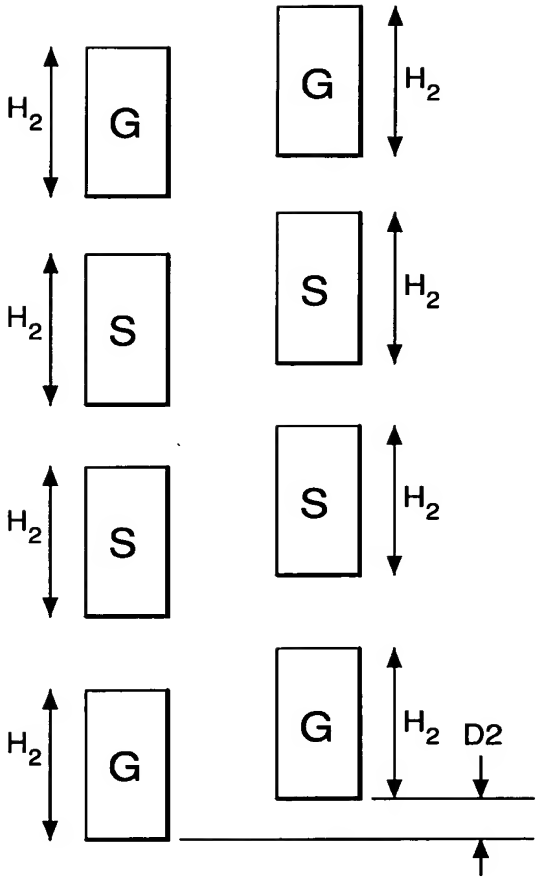

FIG. 28

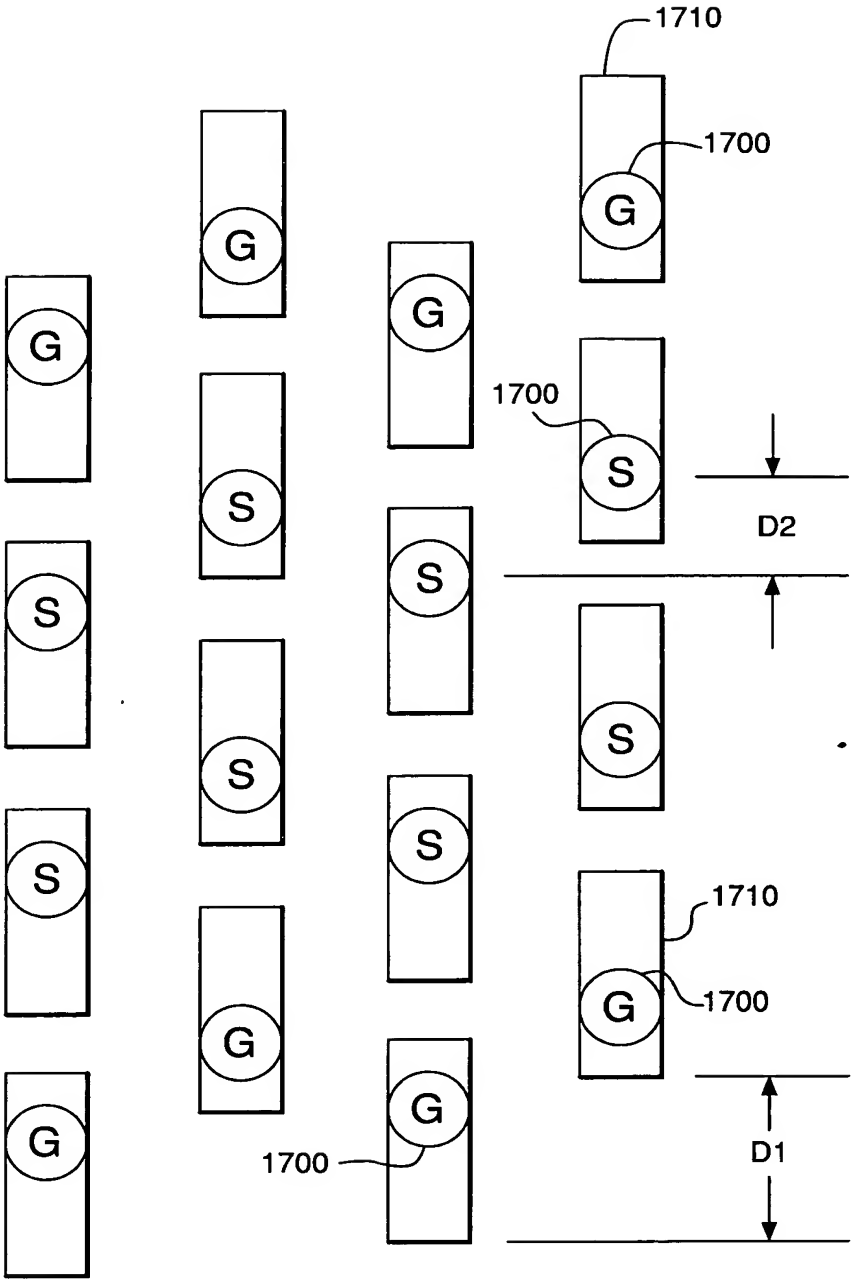

FIG. 29

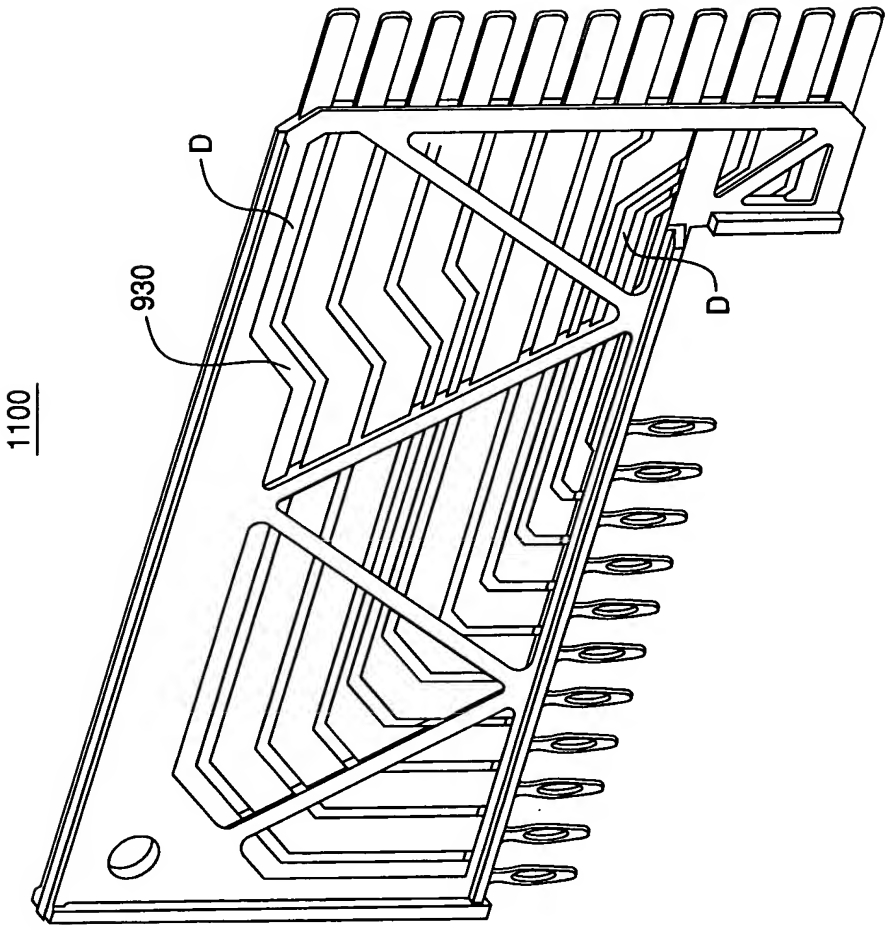

FIG. 30

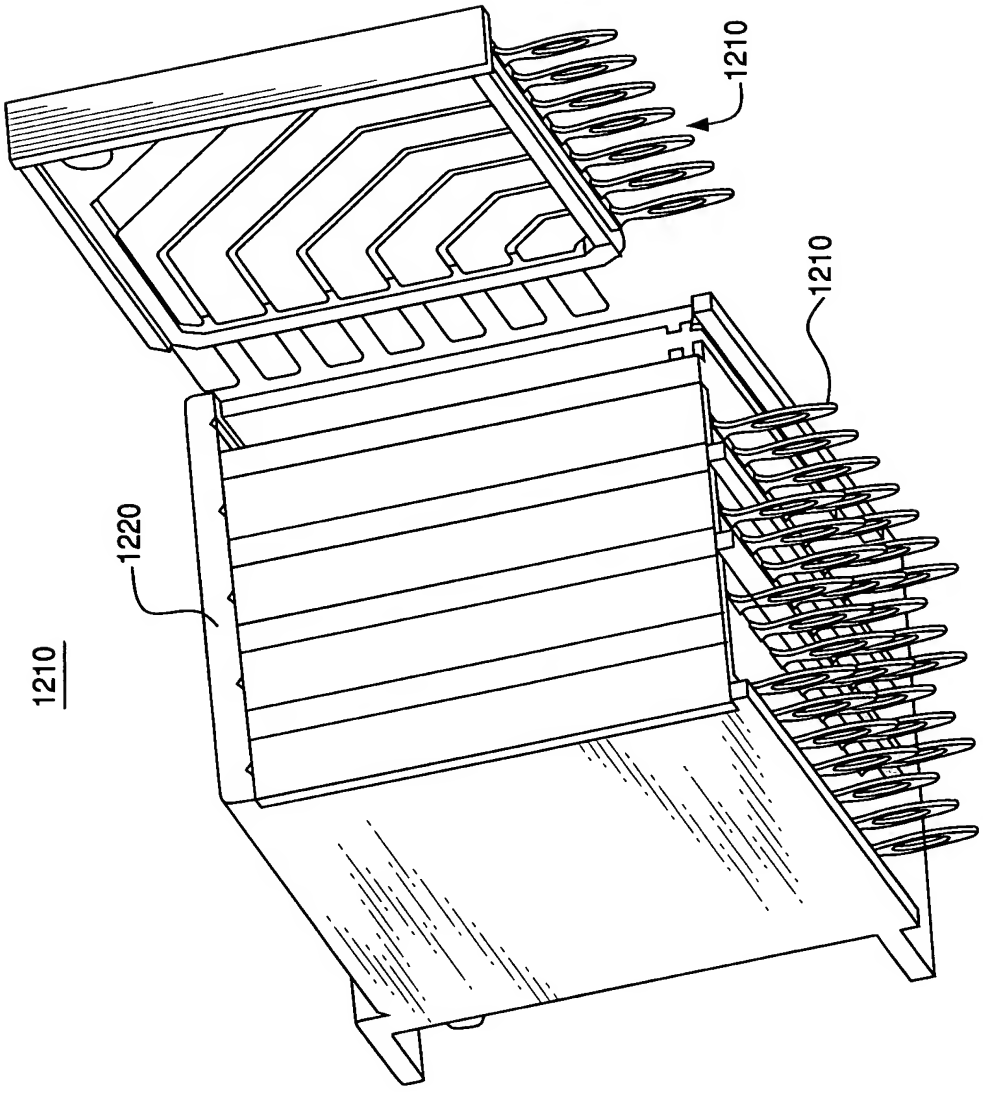

FIG. 31

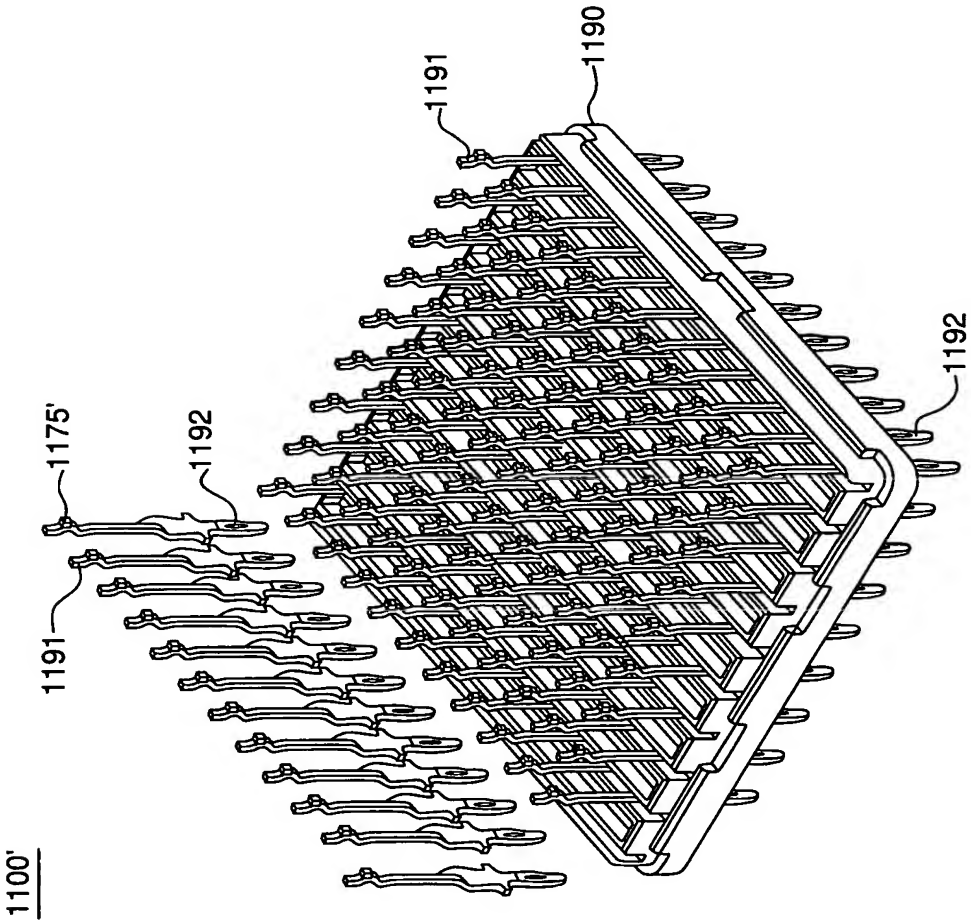

FIG. 32

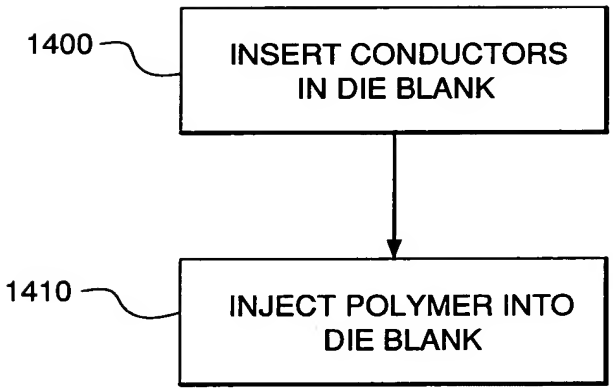
1400
INSERT CONDUCTORS IN DIE BLANK
1410
INJECT POLYMER INTO DIE BLANK

FIG. 33

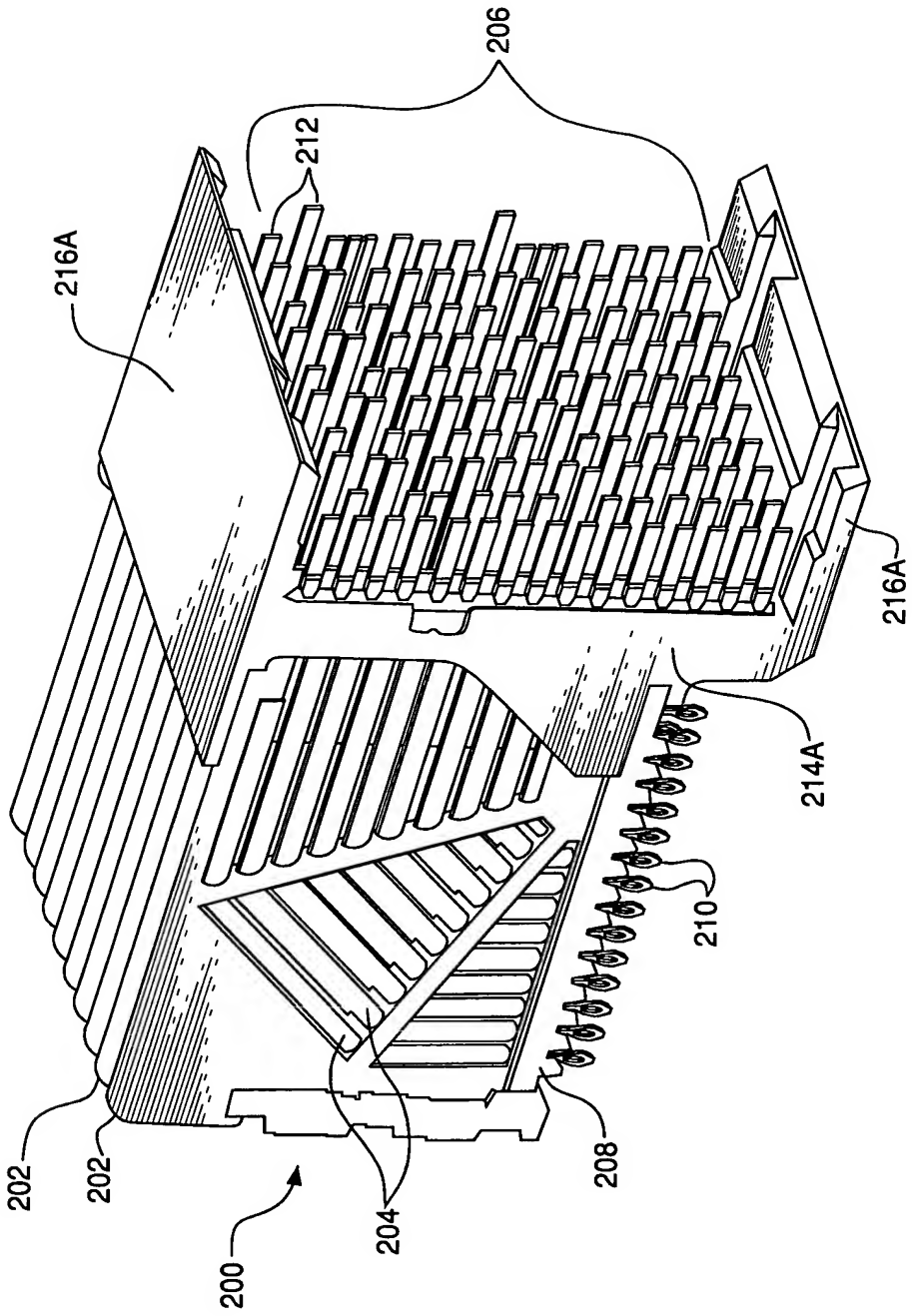

FIG. 34A

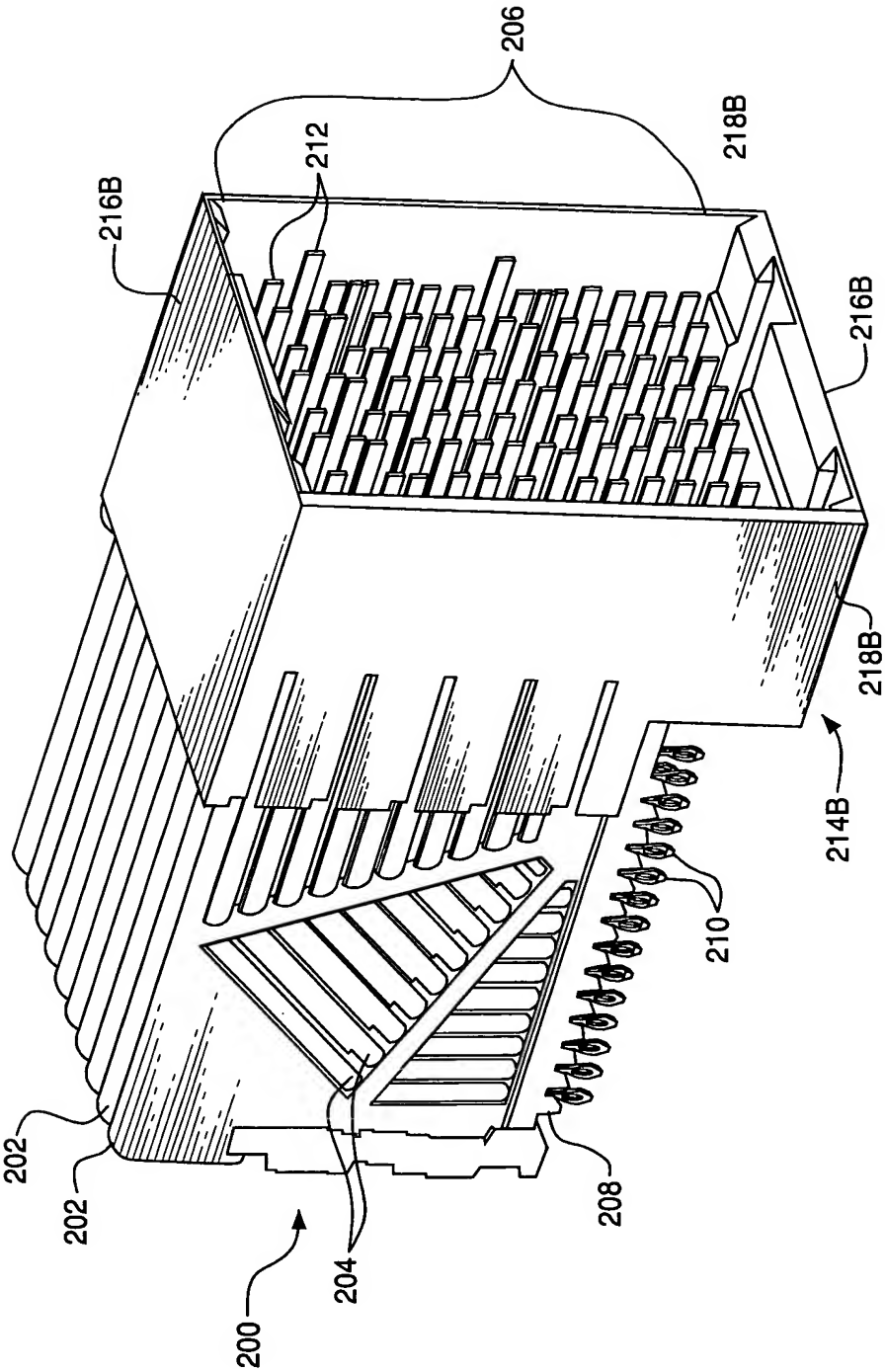

FIG. 34B

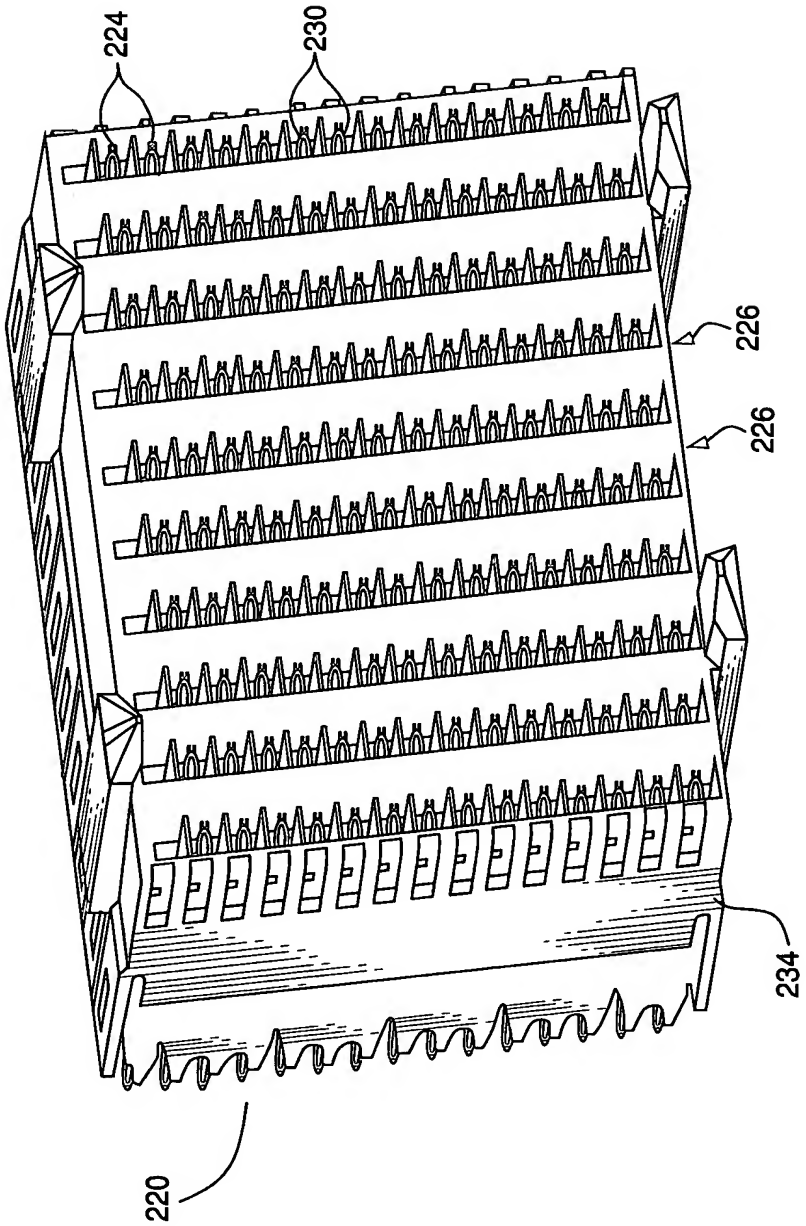

FIG. 35A

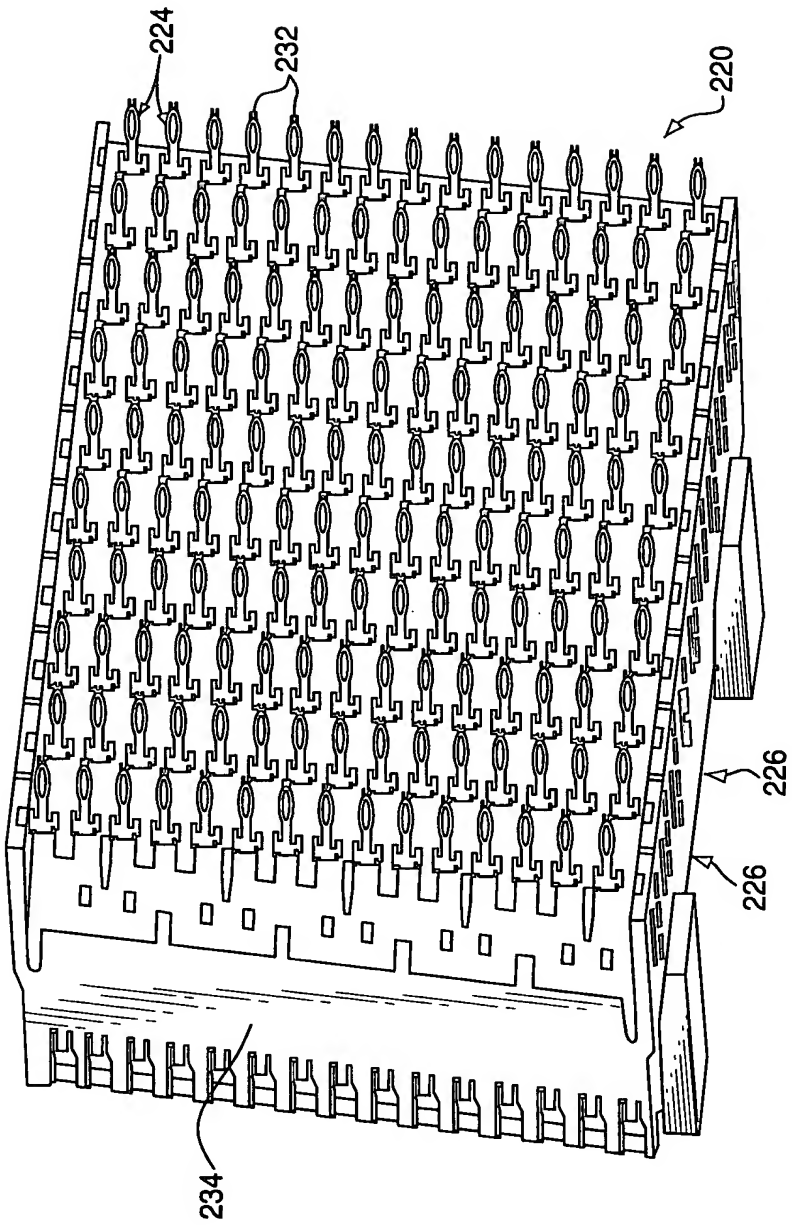

FIG. 35B

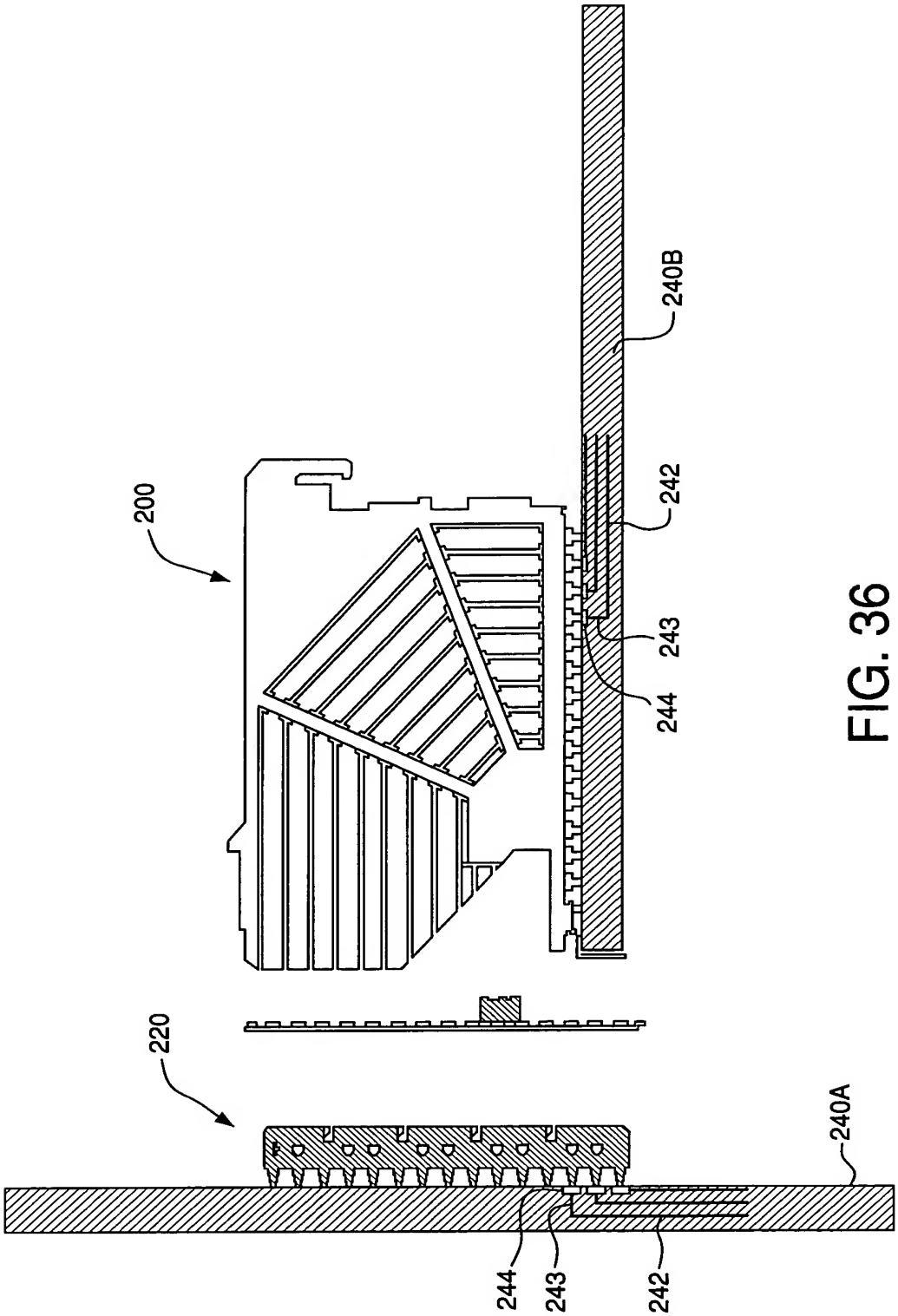

FIG. 36

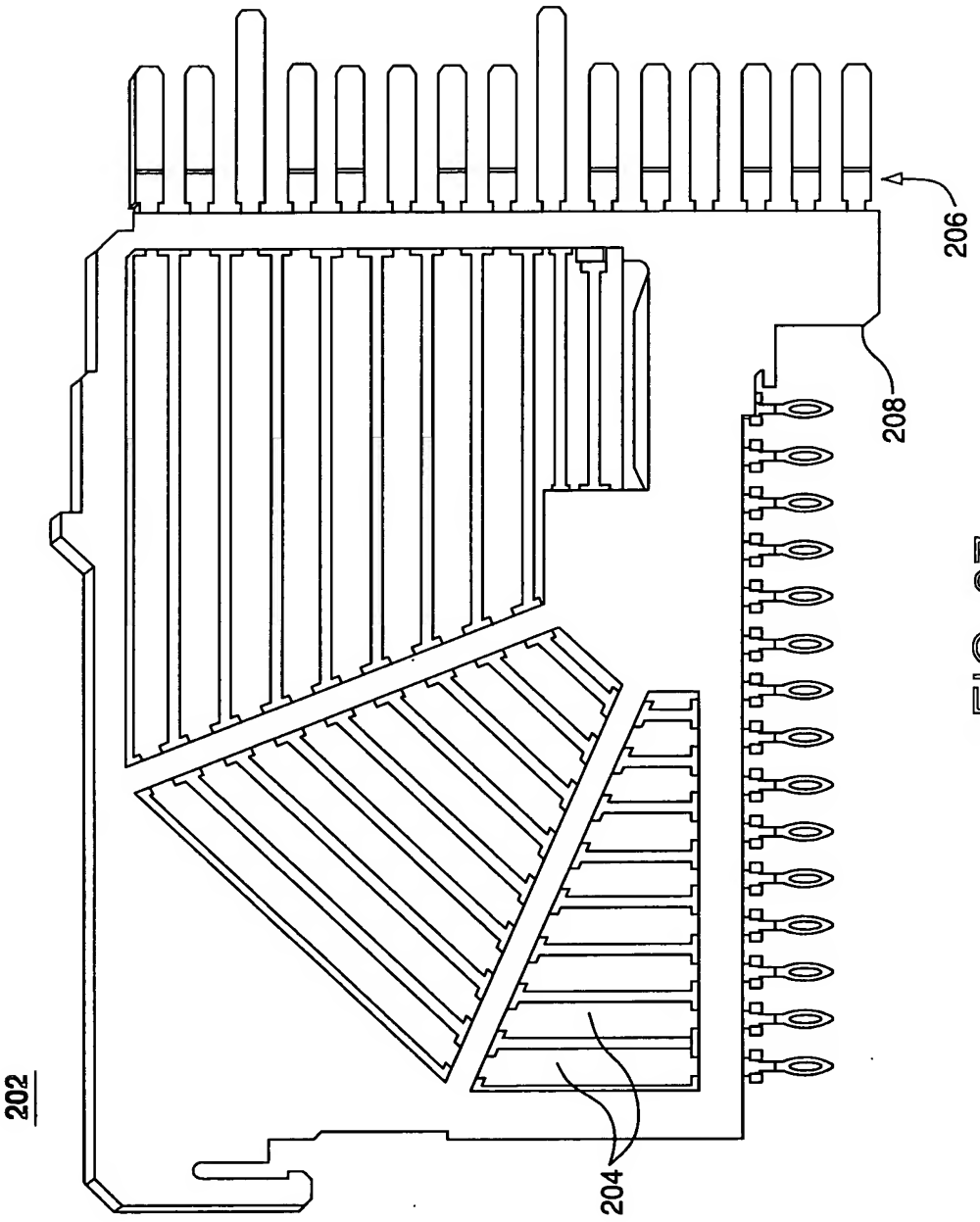

FIG. 37

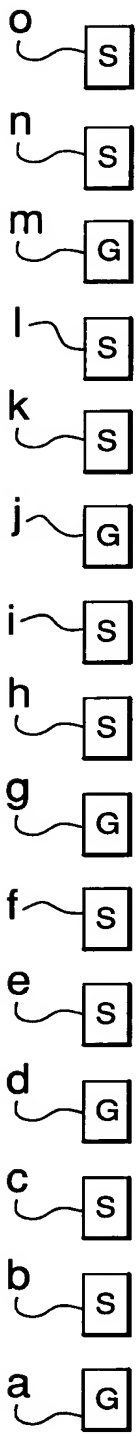

FIG. 38A

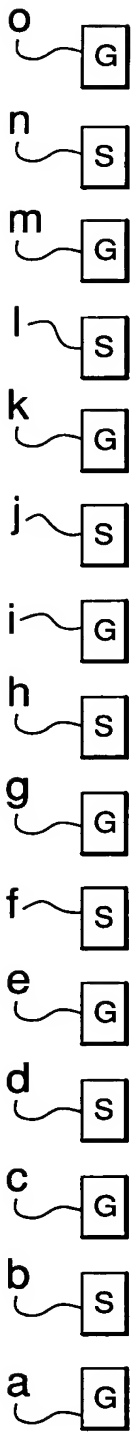

FIG. 38B

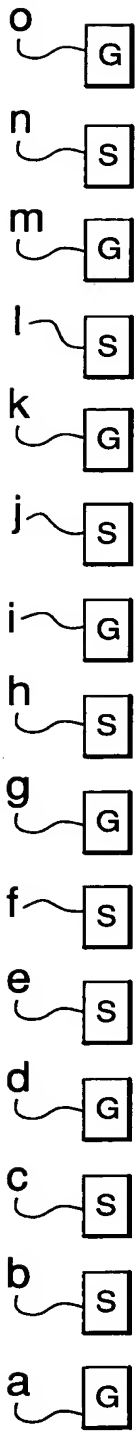

FIG. 38C

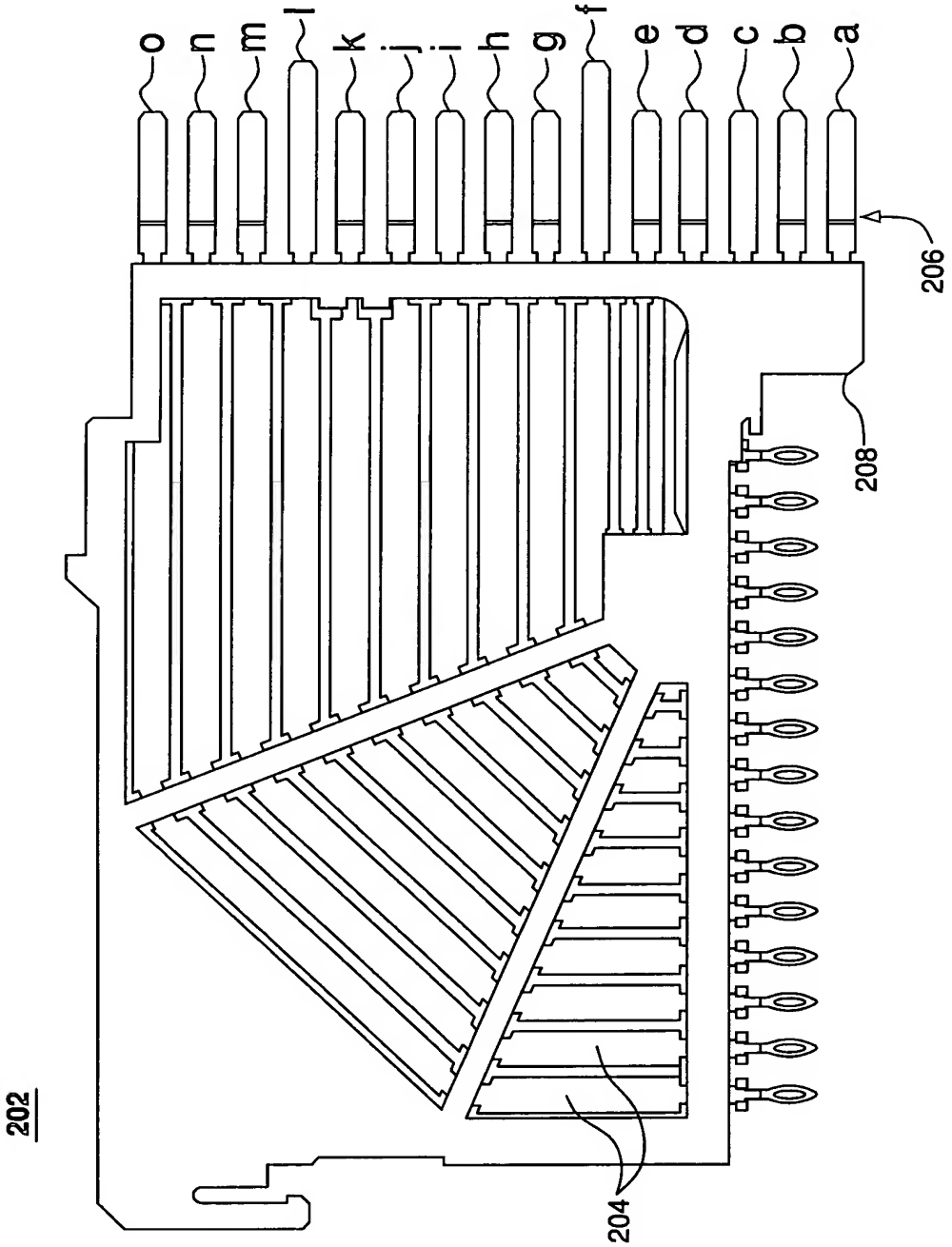

FIG. 39

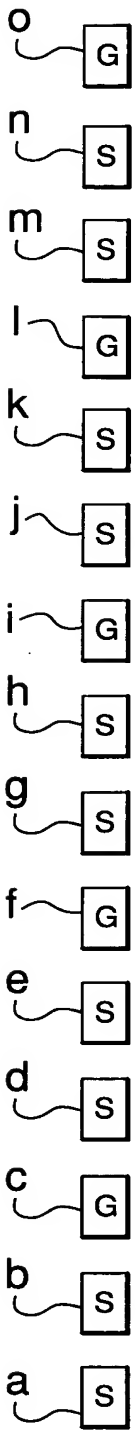

FIG. 40A

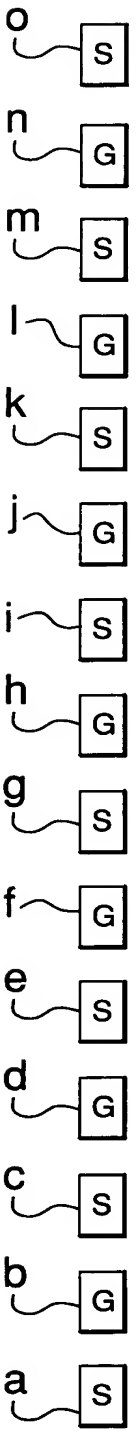

FIG. 40B

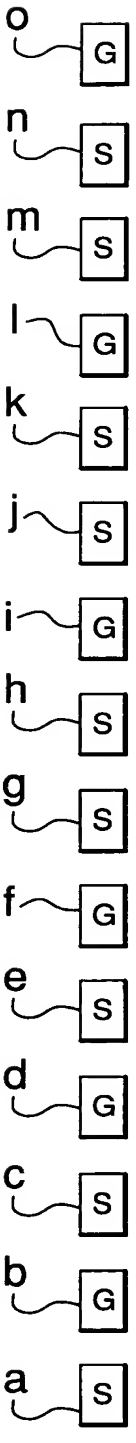

FIG. 40C

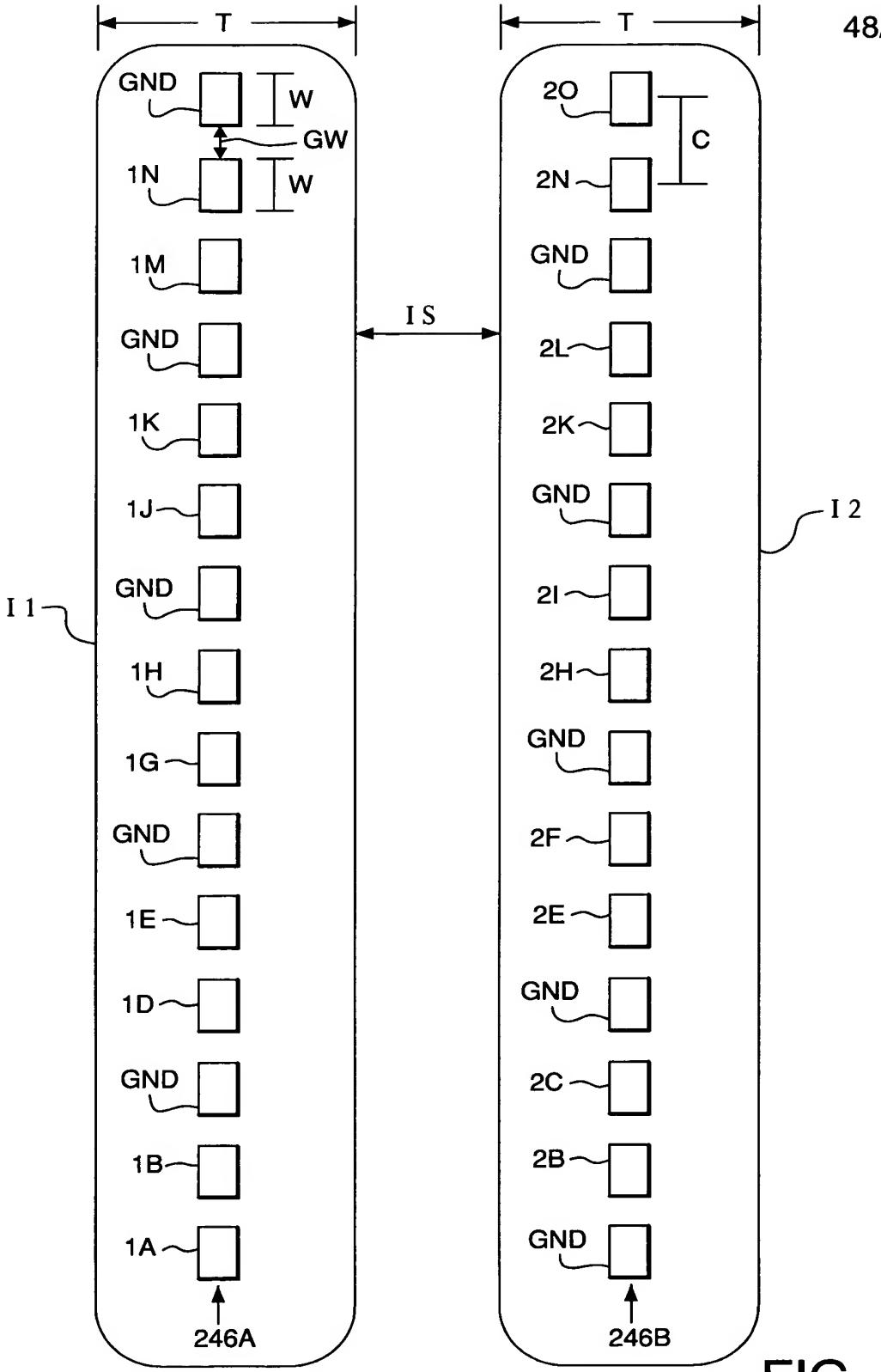
T
T
GND
W
GW
1N
W
1M
GND
1K
1J
GND
1H
1G
GND
1E
1D
GND
1B
1A
246A
I S
2O
C
2N
GND
2L
2K
GND
2I
2H
GND
2F
2E
GND
2C
2B
GND
246B
I 1
I 2

FIG. 41

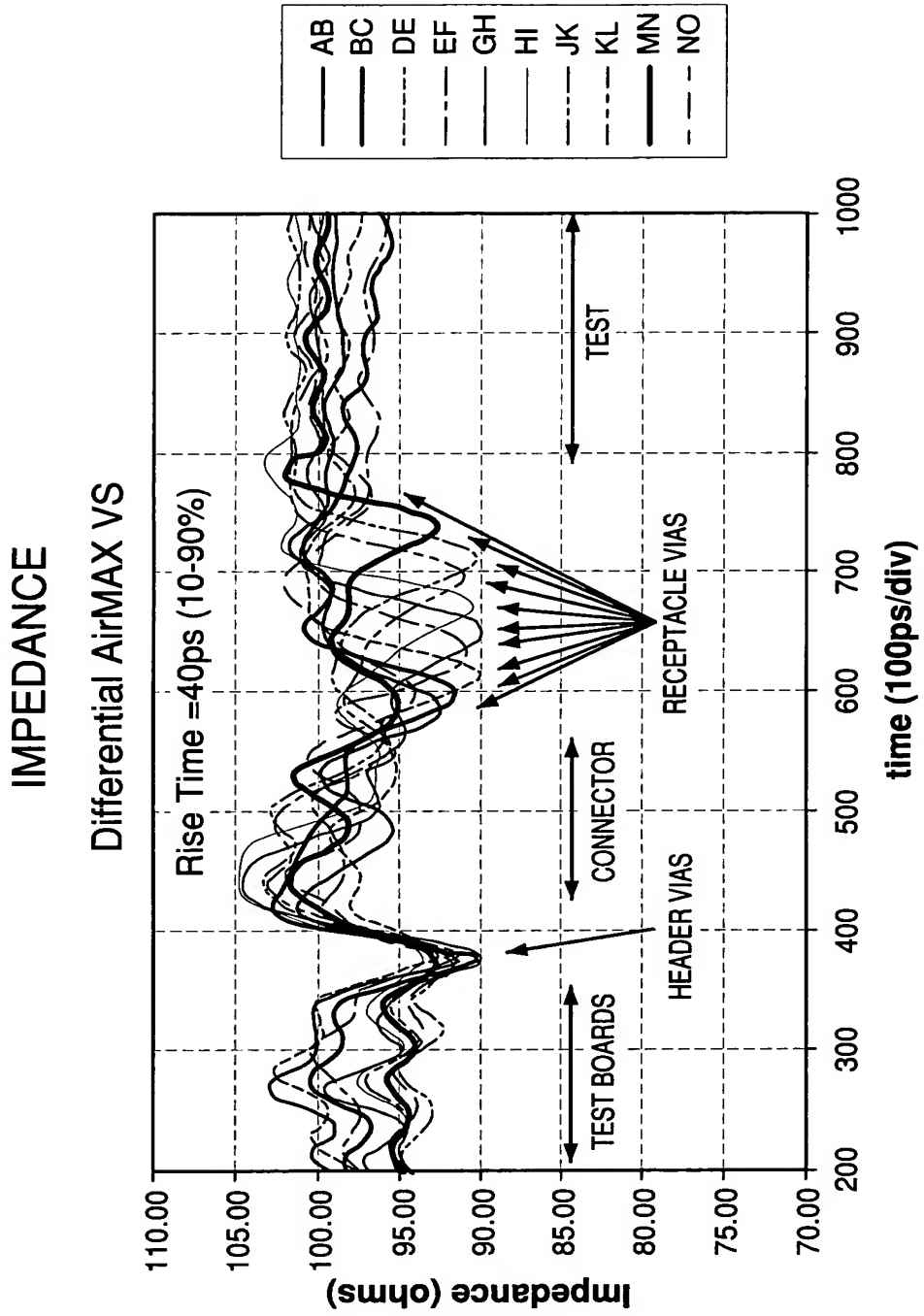
IMPEDANCE
Differential AirMAX VS
Rise Time =40ps (10-90%)
AB
BC
DE
EF
GH
HI
JK
KL
MN
NO
TEST
RECEPTACLE VIAS
CONNECTOR
HEADER VIAS
TEST BOARDS
110.00
105.00
100.00
95.00
90.00
85.00
80.00
75.00
70.00
Impedance (ohms)
200
300
400
500
600
700
800
900
1000
time (100ps/div)

FIG. 42A

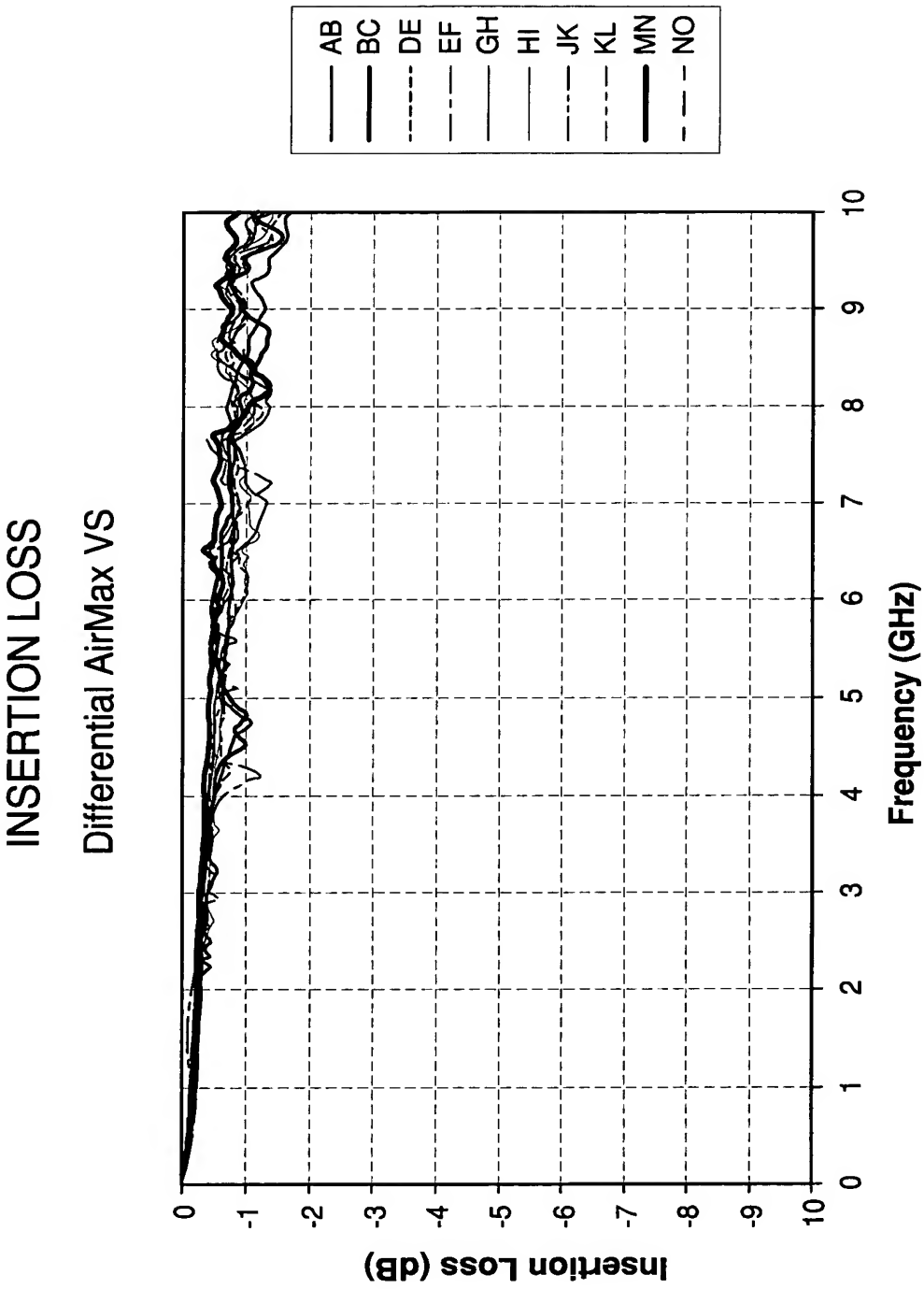
INSERTION LOSS
Differential AirMax VS
AB
BC
DE
EF
GH
HI
JK
KL
MN
NO
Insertion Loss (dB)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
Frequency (GHz)
0
1
2
3
4
5
6
7
8
9
10

FIG. 42B

CROSSTALK

Worst-Case Multi-Active Near-End Crosstalk

	AB	BC	DE	EF	GH	HI	JK	KL	MN	NO
40ps (10-90%)	1.9	2.4	2.4	2.3	2.5	2.2	2.4	2.1	2.6	1.7
100ps (10-90%)	1.4	1.8	1.7	1.8	1.9	1.7	2.0	1.7	1.8	1.0

FIG. 42C

Worst-Case Multi-Active Far-End Crosstalk

	AB	BC	DE	EF	GH	HI	JK	KL	MN	NO
40ps (10-90%)	2.7	1.8	5.0	3.4	4.2	3.2	4.1	2.9	2.4	1.1
100ps (10-90%)	1.3	0.8	2.2	1.5	1.9	1.4	1.8	1.3	1.1	0.5

FIG. 42D

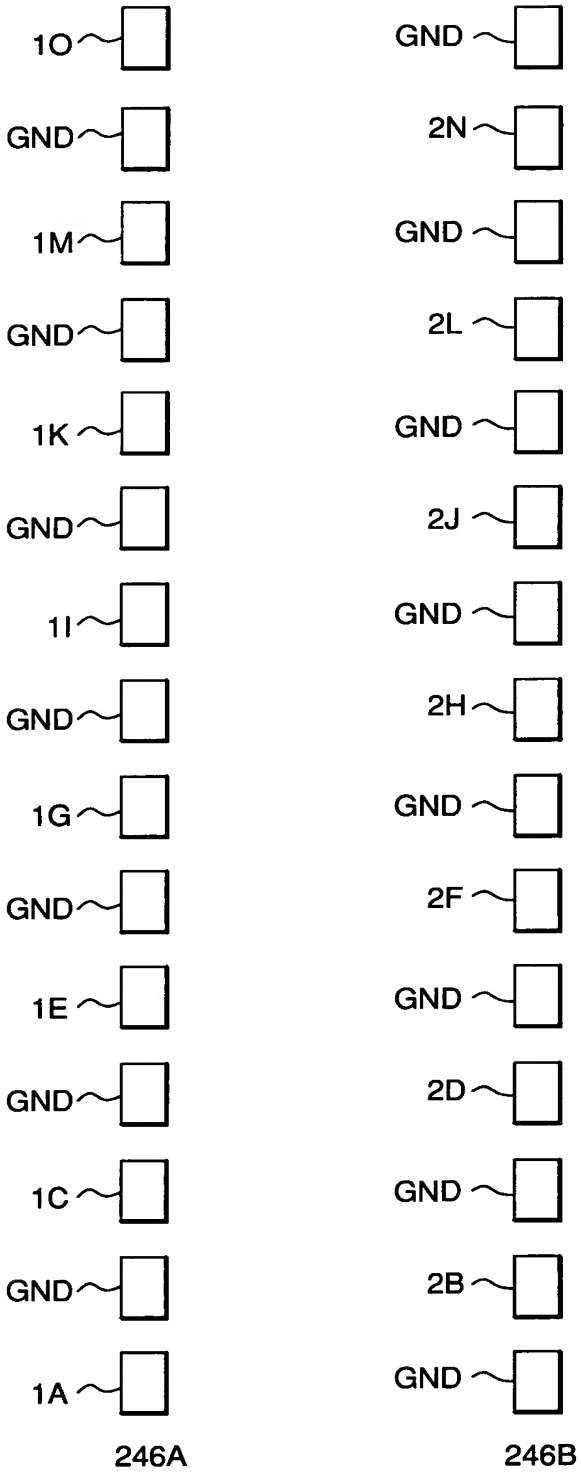
1O
GND
1M
GND
1K
GND
1I
GND
1G
GND
1E
GND
1C
GND
1A
246A
GND
2N
GND
2L
GND
2J
GND
2H
GND
2F
GND
2D
GND
2B
GND
246B

FIG.43

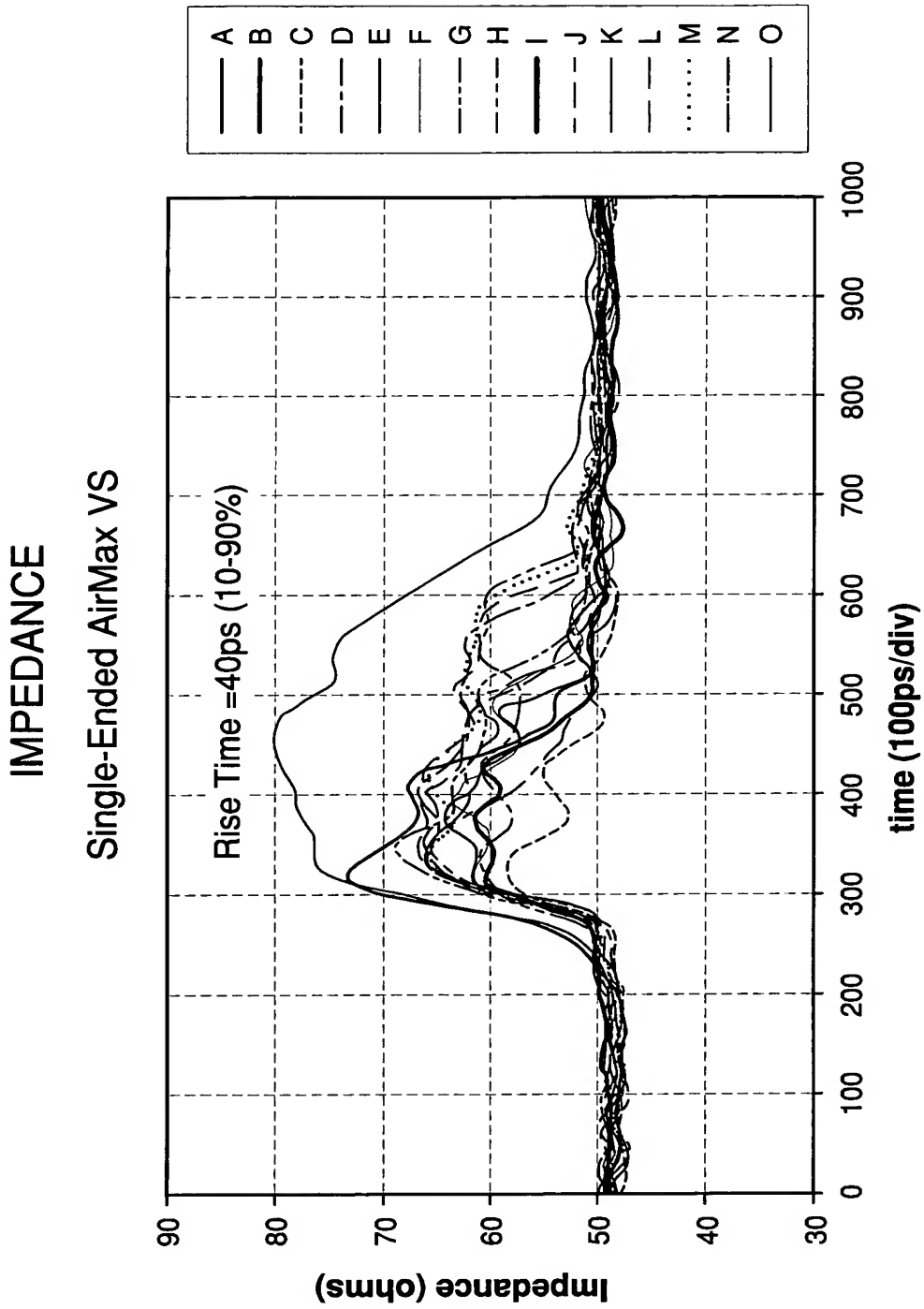
IMPEDANCE
Single-Ended AirMax VS
Rise Time =40ps (10-90%)
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
90
80
70
60
50
40
30
Impedance (ohms)
0
100
200
300
400
500
600
700
800
900
1000
time (100ps/div)

FIG. 44A

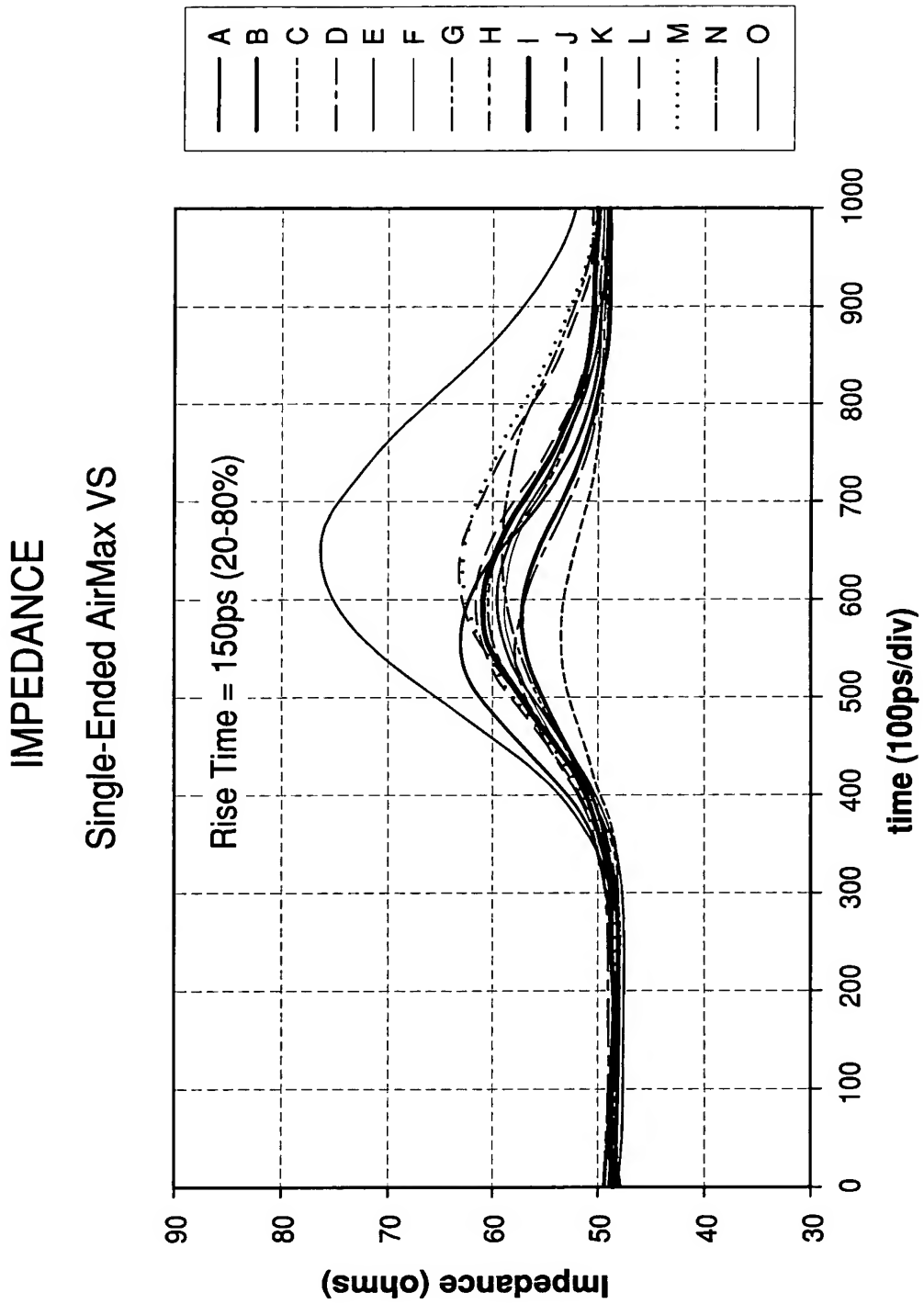
IMPEDANCE
Single-Ended AirMax VS
Rise Time = 150ps (20-80%)
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
90
80
70
60
50
40
30
impedance (ohms)
0
100
200
300
400
500
600
700
800
900
1000
time (100ps/div)

FIG. 44B

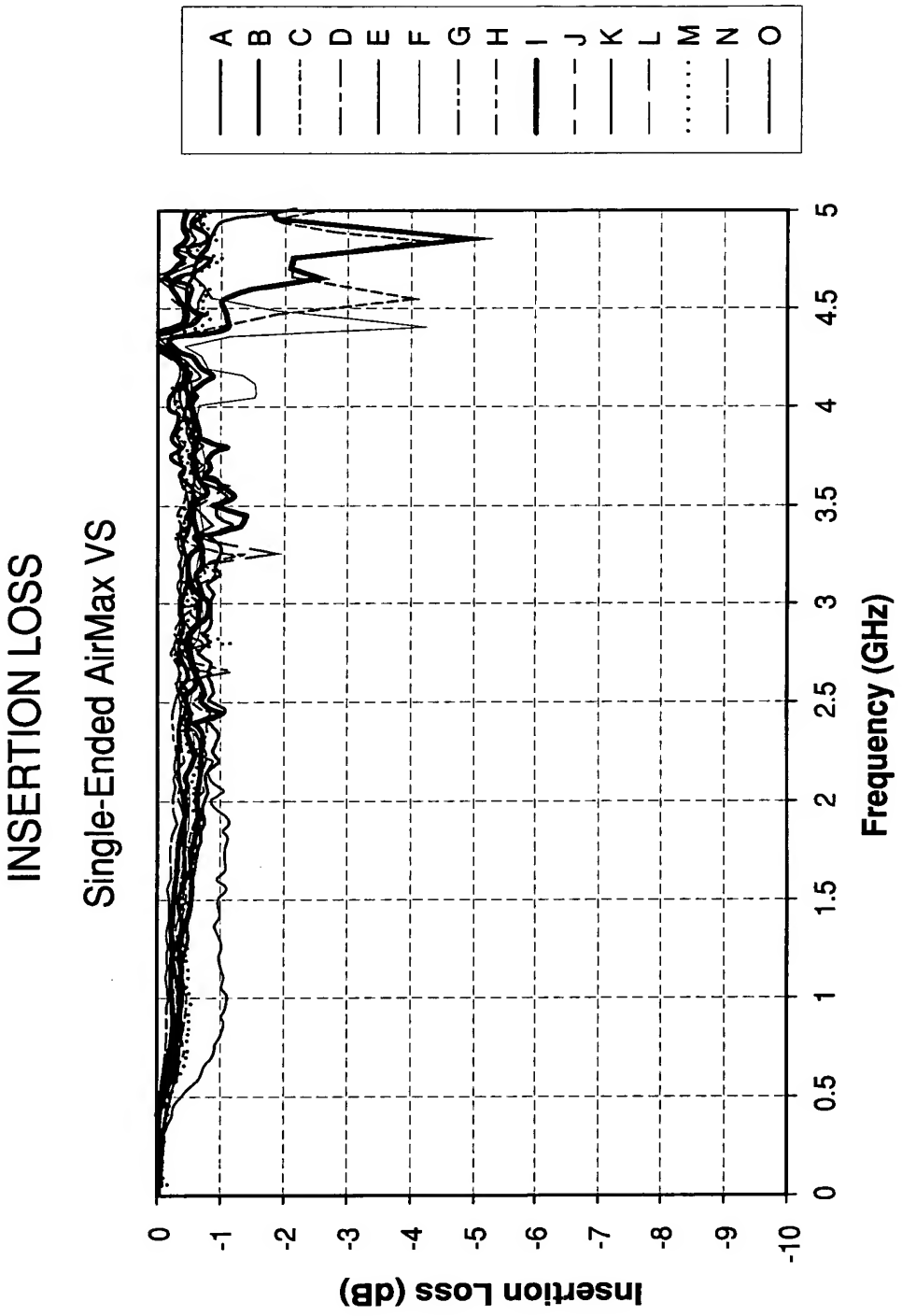
INSERTION LOSS
Single-Ended AirMax VS
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
Insertion Loss (dB)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
Frequency (GHz)

FIG. 44C

CROSSTALK

Worst-Case Multi-Active Near-End Crosstalk

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
150ps(20-80%)	5.0	7.3	7.3	7.4	6.0	6.2	7.2	7.6	8.0	8.7	6.6	7.6	8.0	7.8	4.2

FIG. 44D

Worst-Case Multi-Active Far-End Crosstalk

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
150ps(20-80%)	2.0	2.9	2.4	2.4	2.6	2.4	2.9	2.9	2.5	2.8	2.6	2.7	2.8	2.8	1.7

FIG. 44E

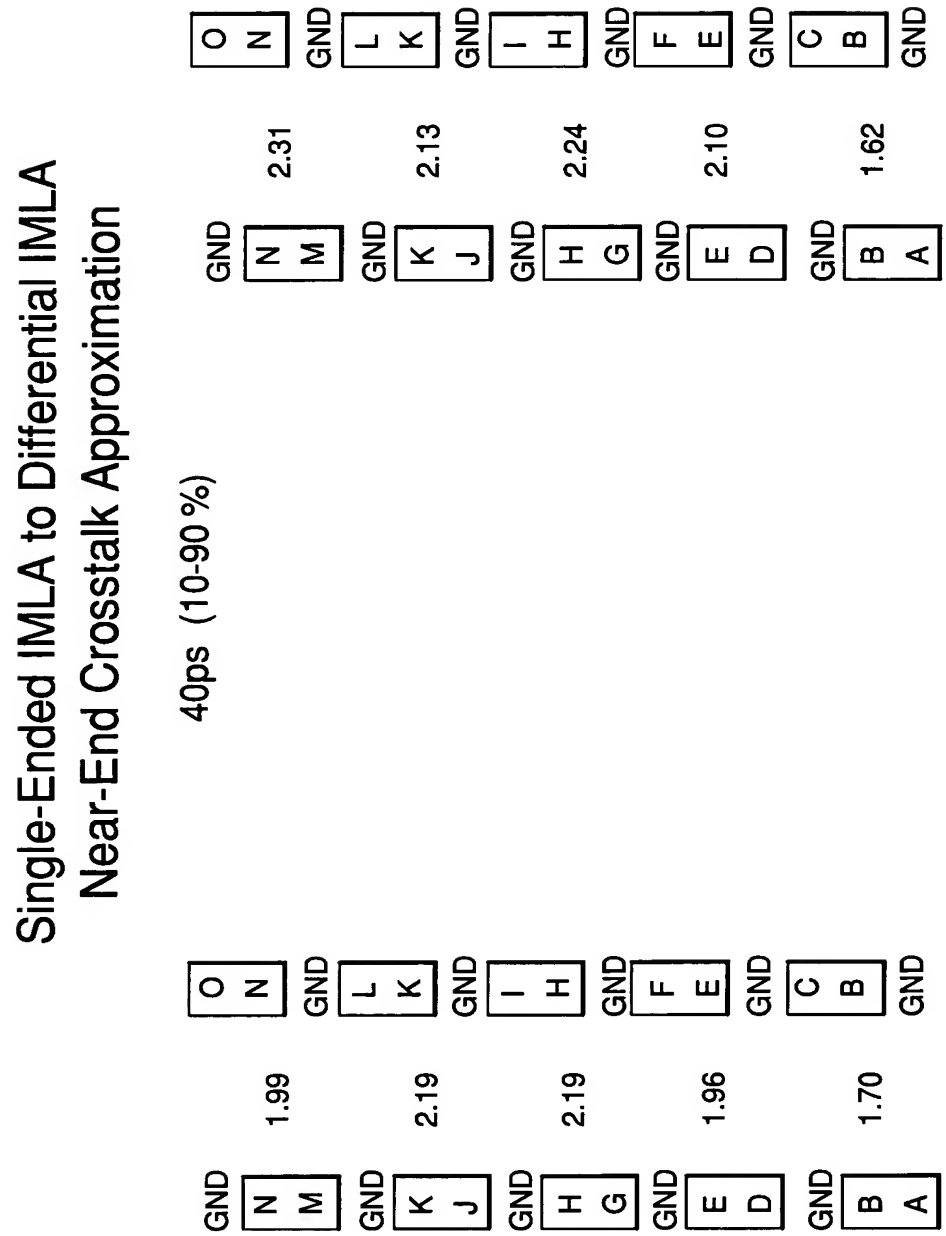
Single-Ended IMLA to Differential IMLA
Near-End Crosstalk Approximation
40ps (10-90 %)
GND N M GND K J GND H G GND E D GND B A
1.99 2.19 2.19 1.96 1.70
O N GND L K GND I H GND F E GND C B GND
GND N M GND K J GND H G GND E D GND B A
2.31 2.13 2.24 2.10 1.62
O N GND L K GND I H GND F E GND C B GND

FIG. 45A

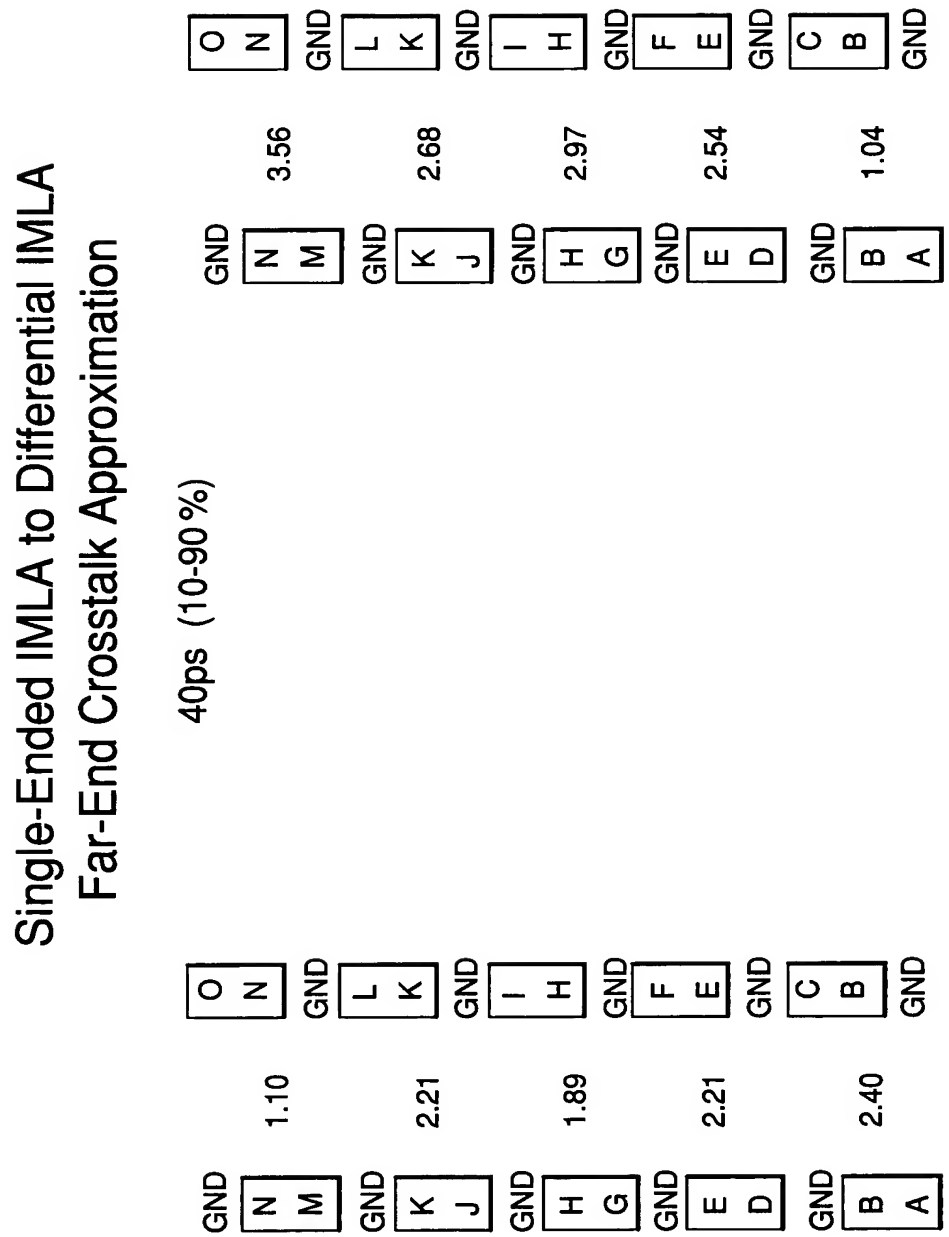
Single-Ended IMLA to Differential IMLA
Far-End Crosstalk Approximation
40ps (10-90%)
GND N M GND K J GND H G GND E D GND B A
1.10 2.21 1.89 2.21 2.40
O N GND L K GND I H GND F E GND C B GND
3.56 2.68 2.97 2.54 1.04

FIG. 45B

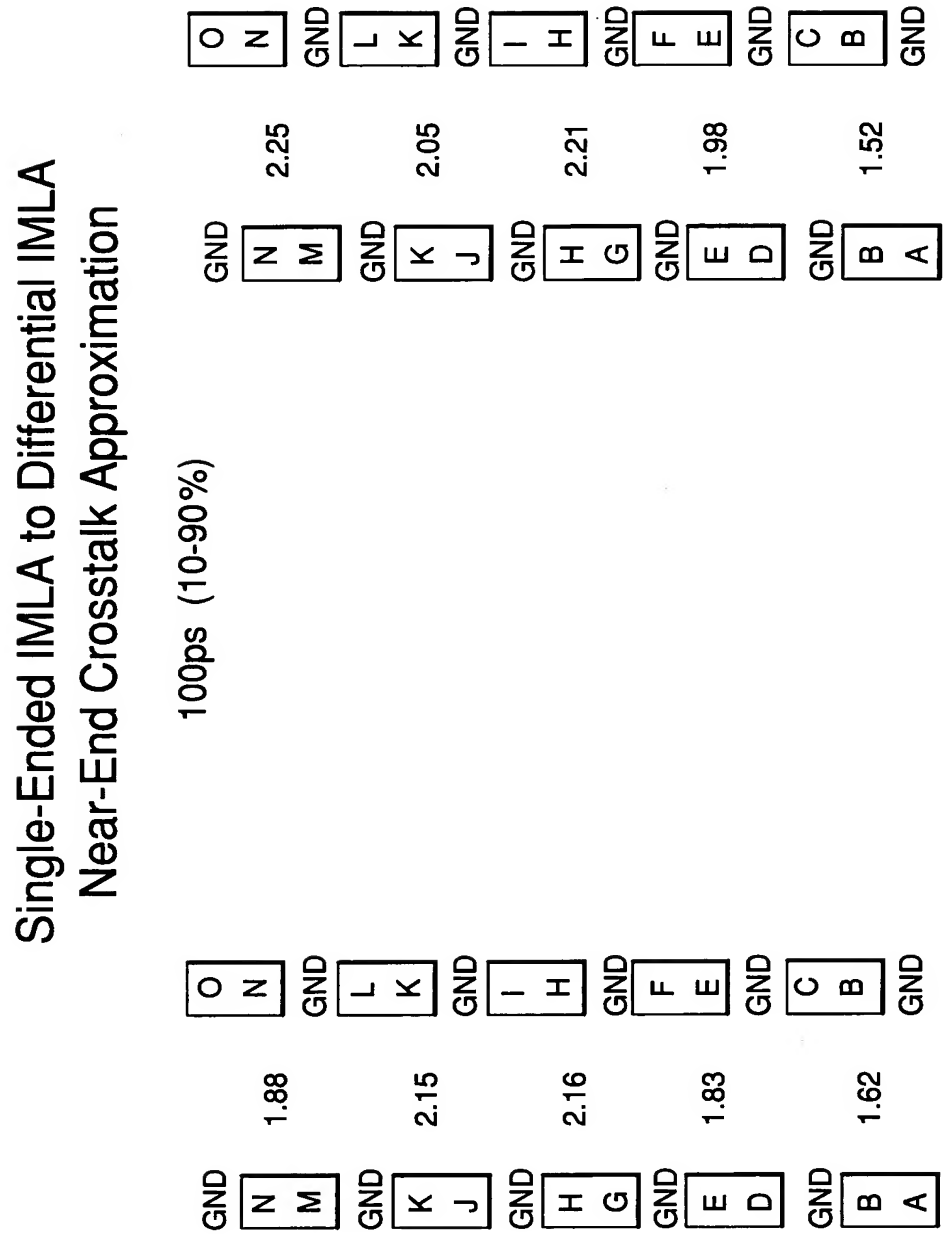
Single-Ended IMLA to Differential IMLA
Near-End Crosstalk Approximation
100ps (10-90%)
GND N M GND K J GND H G GND E D GND B A
1.88 2.15 2.16 1.83 1.62
O N GND L K GND I H GND F E GND C B GND
2.25 2.05 2.21 1.98 1.52

FIG. 45C

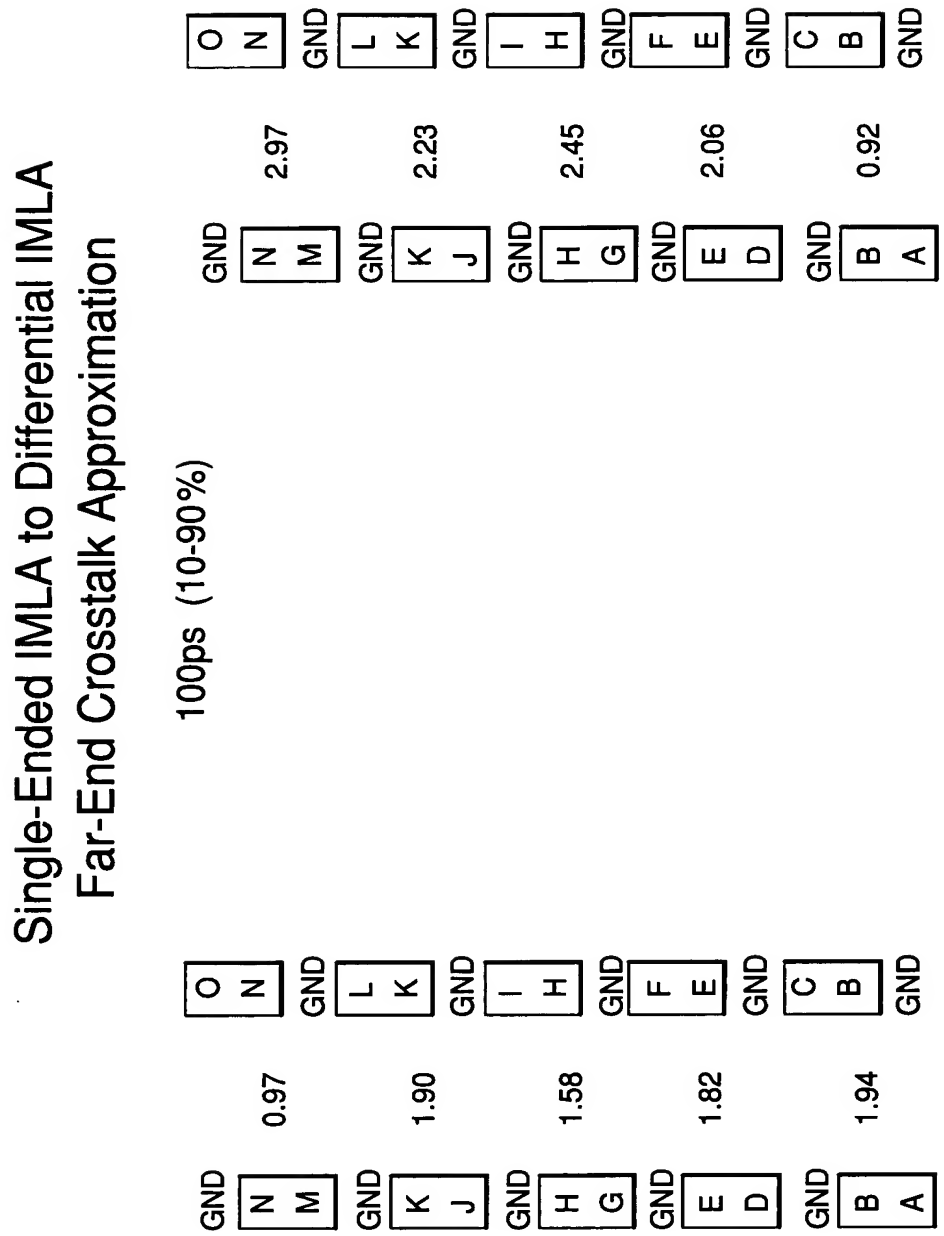
Single-Ended IMLA to Differential IMLA
Far-End Crosstalk Approximation
100ps (10-90%)
GND N M GND K J GND H G GND E D GND B A
0.97 1.90 1.58 1.82 1.94
O N GND L K GND I H GND F E GND C B GND
2.97 2.23 2.45 2.06 0.92

FIG. 45D

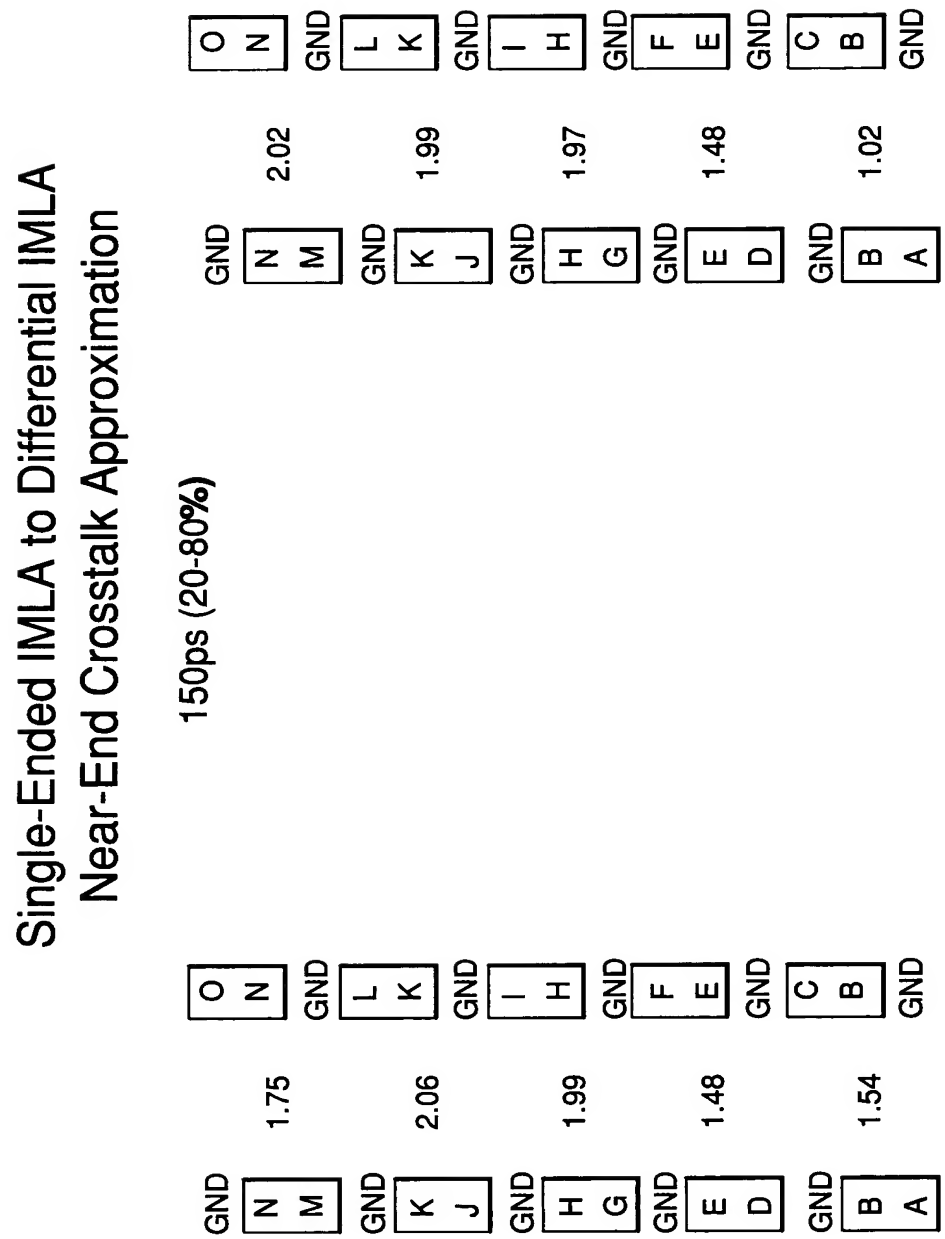
Single-Ended IMLA to Differential IMLA
Near-End Crosstalk Approximation
150ps (20-80%)
GND N M GND K J GND H G GND E D GND B A
1.75 2.06 1.99 1.48 1.54
O N GND L K GND I H GND F E GND C B GND
GND N M GND K J GND H G GND E D GND B A
2.02 1.99 1.97 1.48 1.02
O N GND L K GND I H GND F E GND C B GND

FIG. 45E

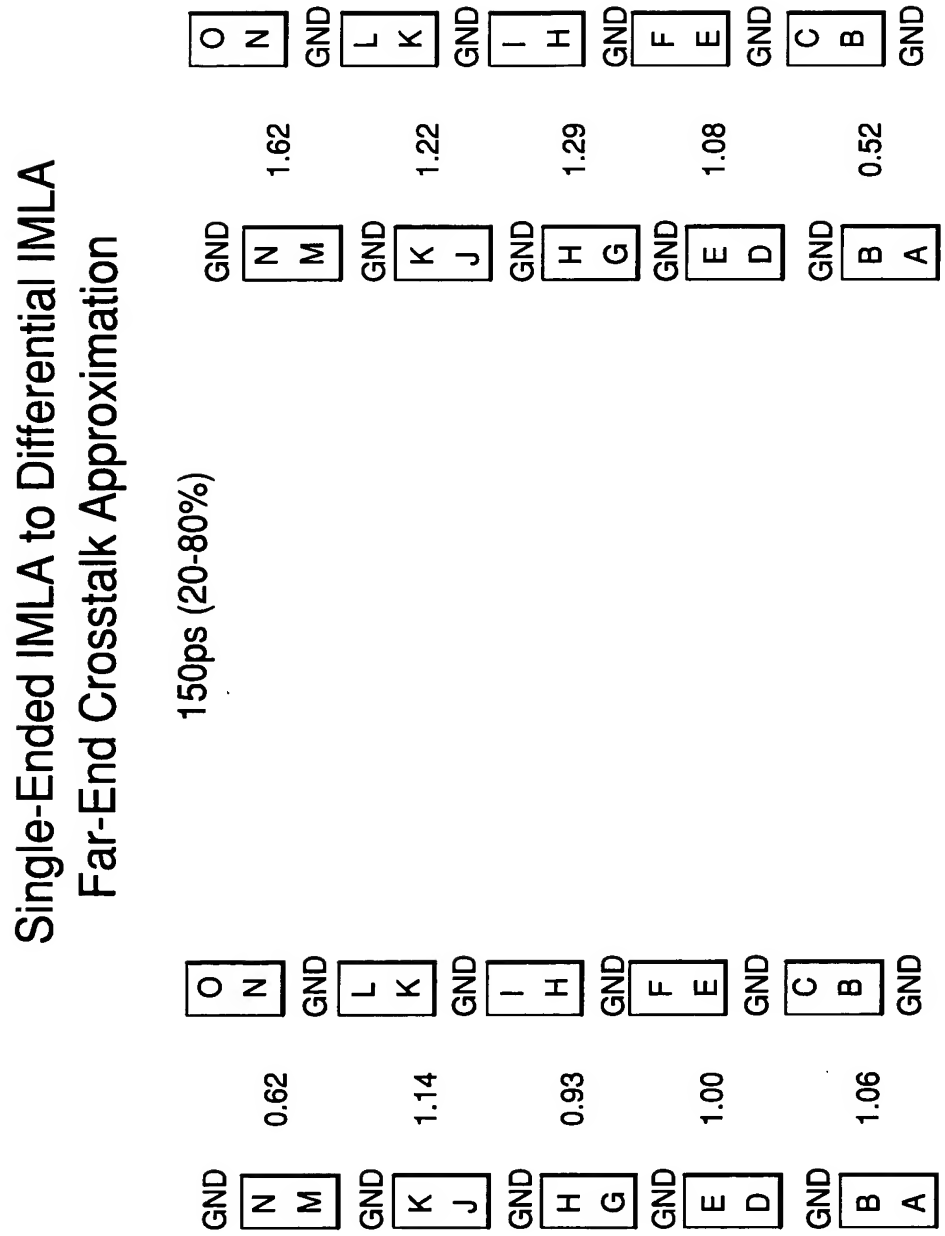
Single-Ended IMLA to Differential IMLA
Far-End Crosstalk Approximation
150ps (20-80%)
GND N M GND K J GND H G GND E D GND B A
0.62 1.14 0.93 1.00 1.06
O N GND L K GND I H GND F E GND C B GND
1.62 1.22 1.29 1.08 0.52

FIG. 45F

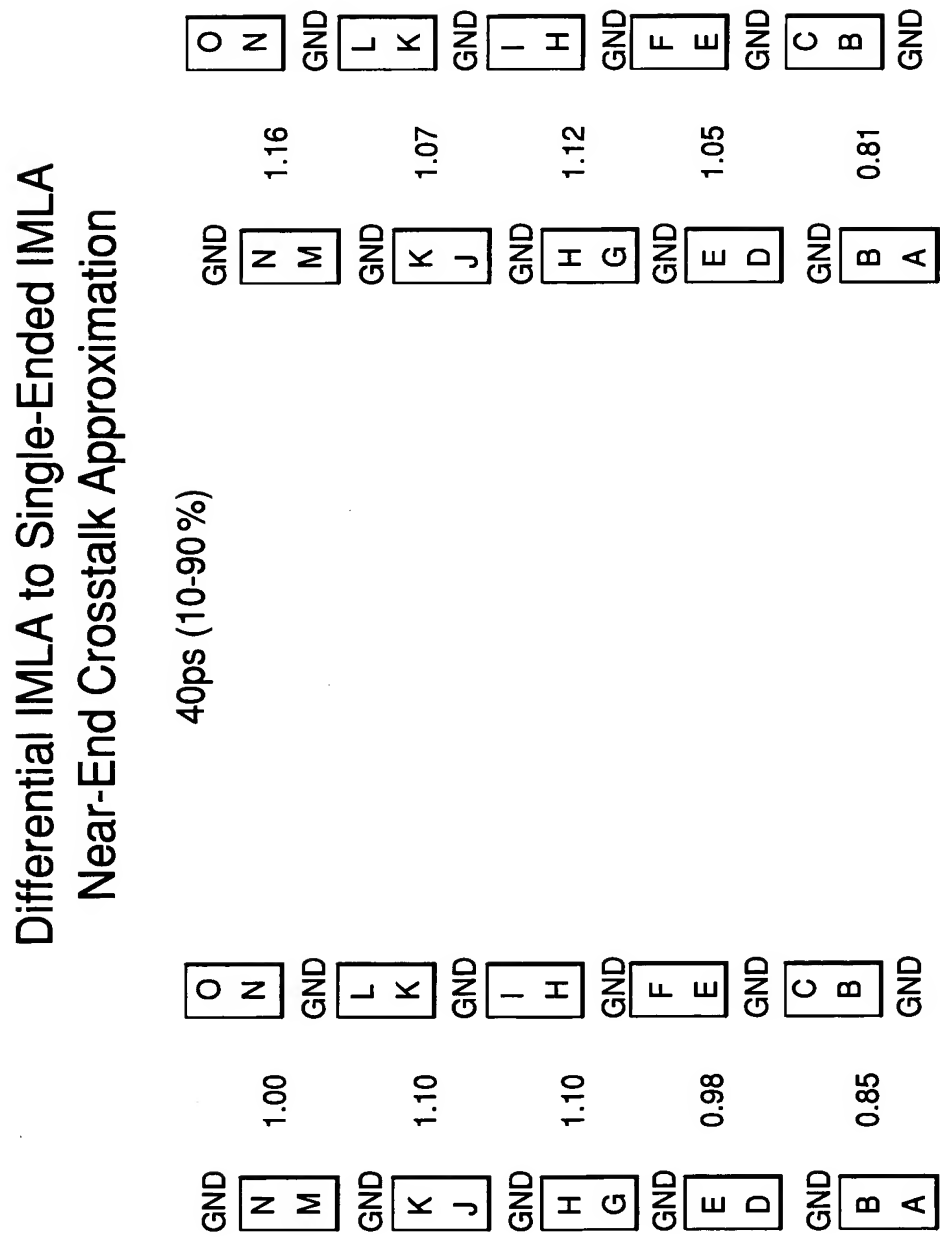
Differential IMLA to Single-Ended IMLA
Near-End Crosstalk Approximation
40ps (10-90%)
GND N M GND K J GND H G GND E D GND B A
1.00 1.10 1.10 0.98 0.85
O N GND L K GND I H GND F E GND C B GND
GND N M GND K J GND H G GND E D GND B A
1.16 1.07 1.12 1.05 0.81
O N GND L K GND I H GND F E GND C B GND

FIG. 46A

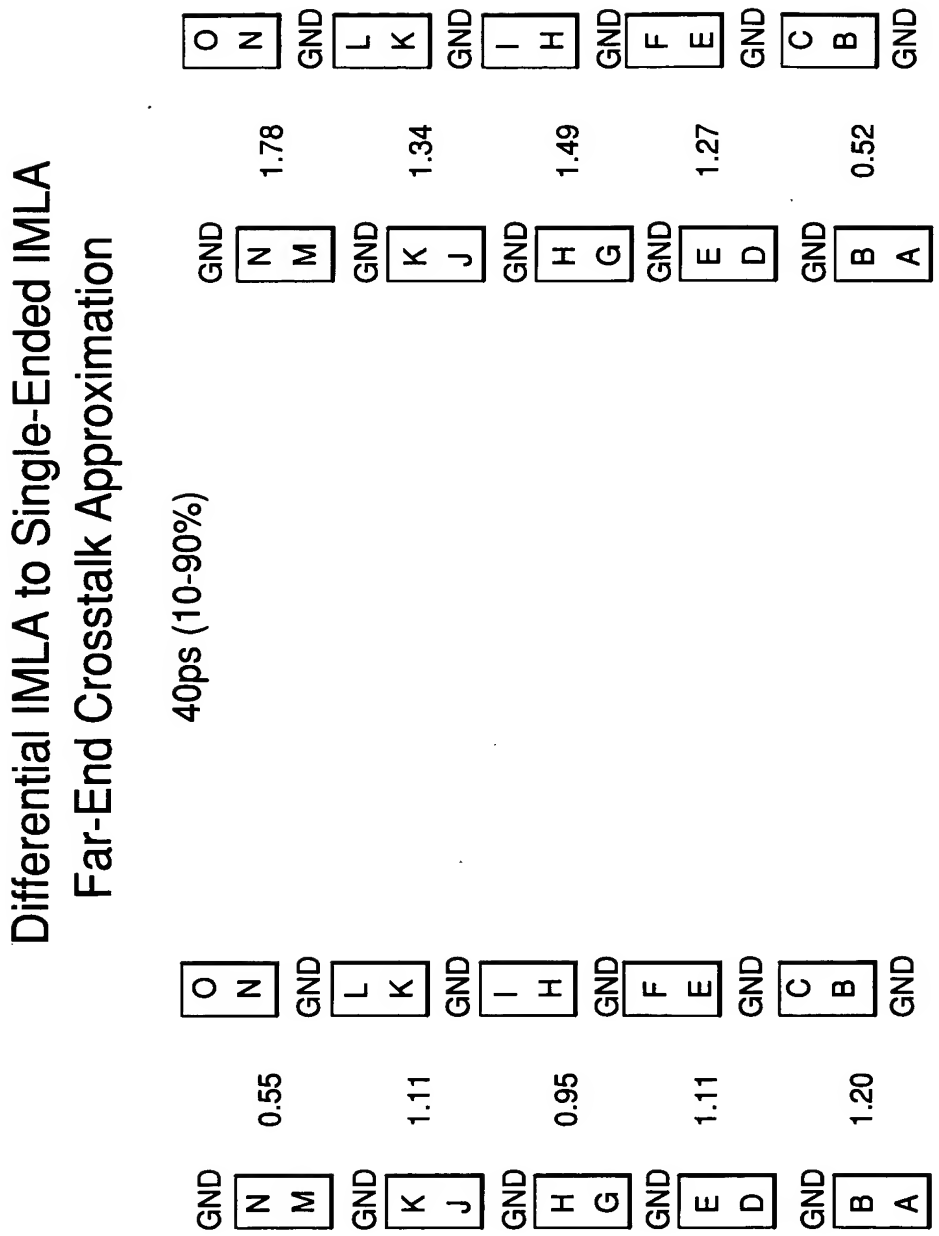
Differential IMLA to Single-Ended IMLA
Far-End Crosstalk Approximation
40ps (10-90%)
GND N M GND K J GND H G GND E D GND B A
0.55 1.11 0.95 1.11 1.20
GND O N GND L K GND I H GND F E GND C B GND
GND O N GND L K GND I H GND F E GND C B GND
1.78 1.34 1.49 1.27 0.52
GND N M GND K J GND H G GND E D GND B A

FIG. 46B

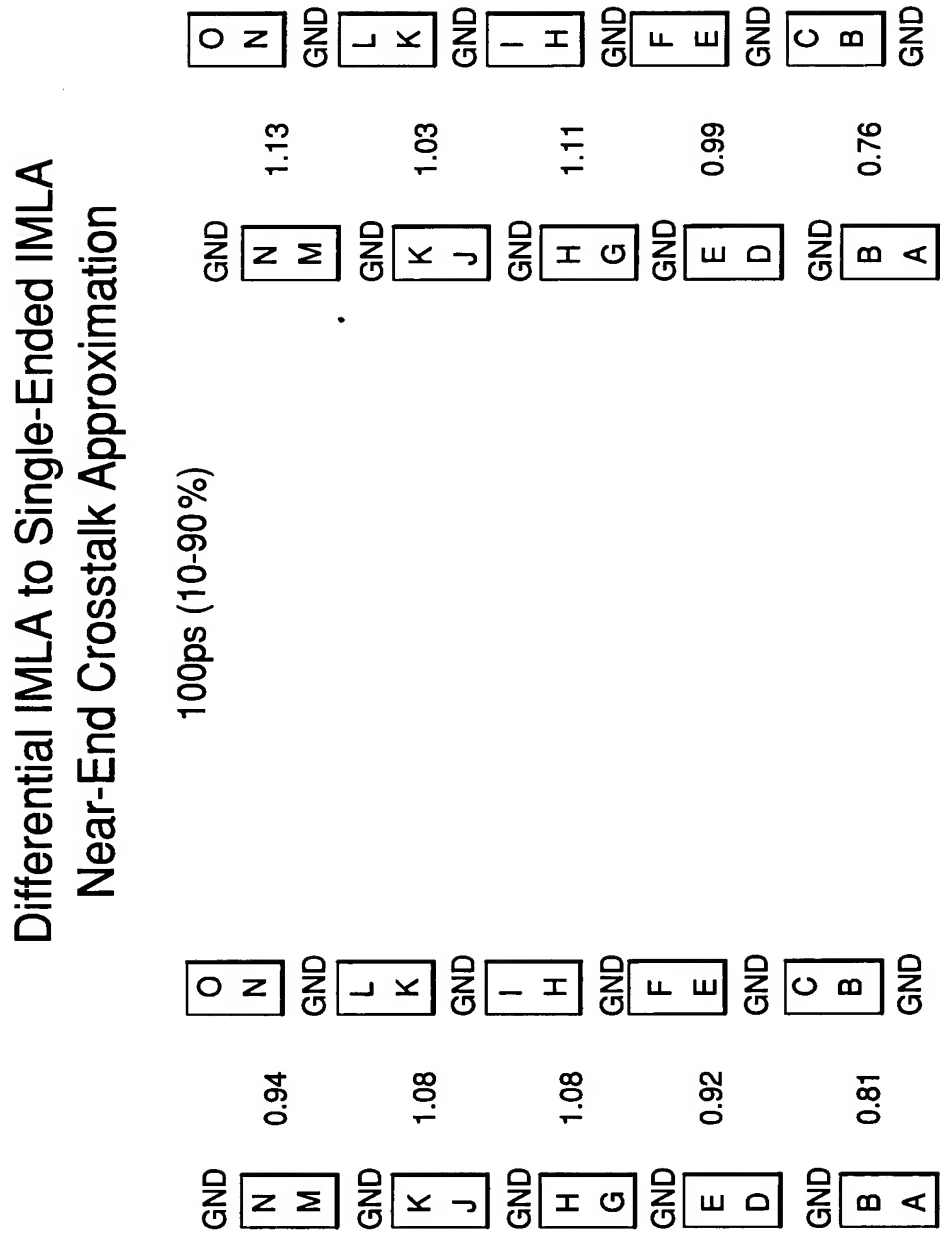
Differential IMLA to Single-Ended IMLA
Near-End Crosstalk Approximation
100ps (10-90%)
GND N M GND K J GND H G GND E D GND B A
0.94 1.08 1.08 0.92 0.81
O N GND L K GND I H GND F E GND C B GND
GND N M GND K J GND H G GND E D GND B A
1.13 1.03 1.11 0.99 0.76
O N GND L K GND I H GND F E GND C B GND

FIG. 46C

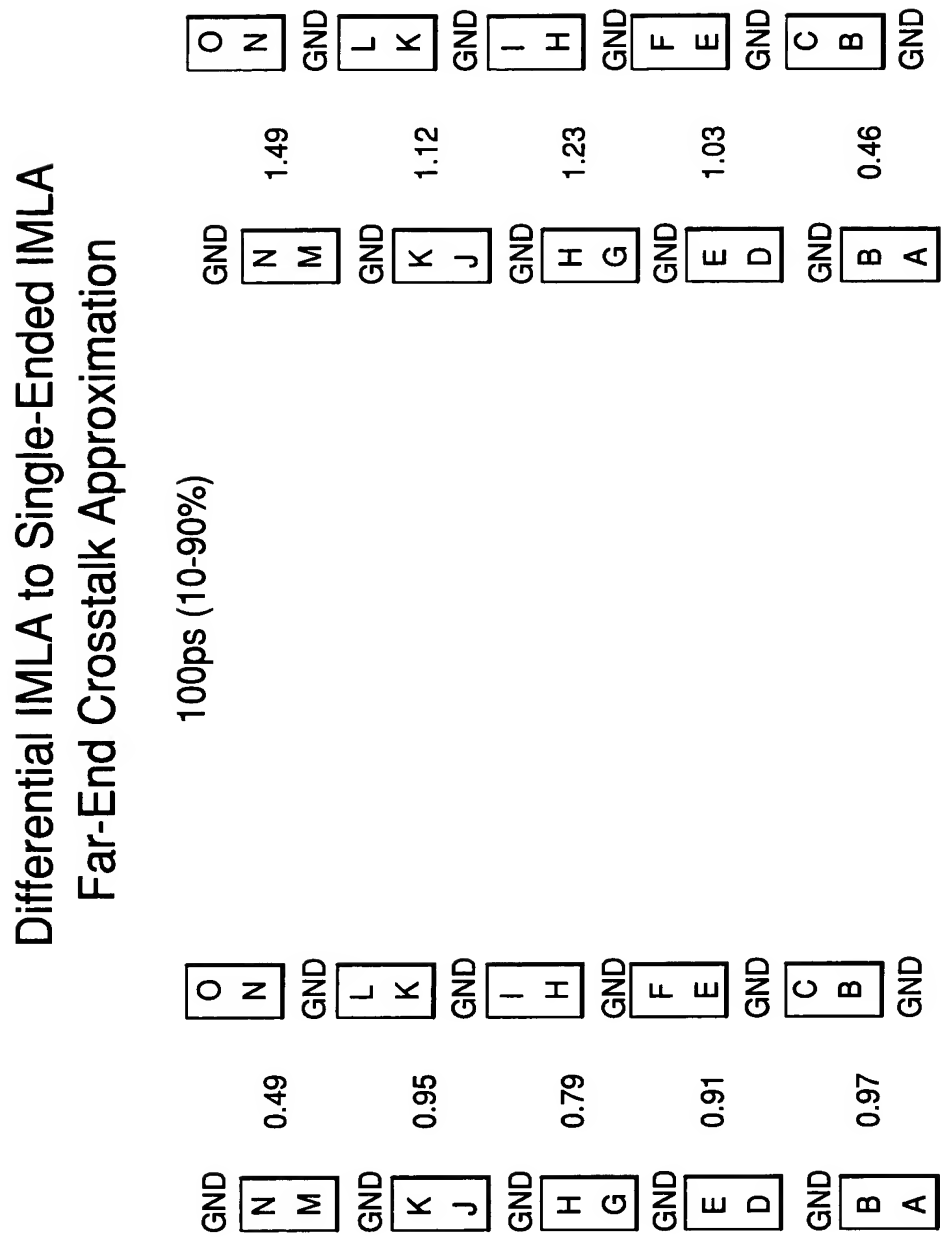
Differential IMLA to Single-Ended IMLA
Far-End Crosstalk Approximation
100ps (10-90%)
GND N M GND K J GND H G GND E D GND B A
0.49 0.95 0.79 0.91 0.97
O N GND L K GND I H GND F E GND C B GND
1.49 1.12 1.23 1.03 0.46

FIG. 46D

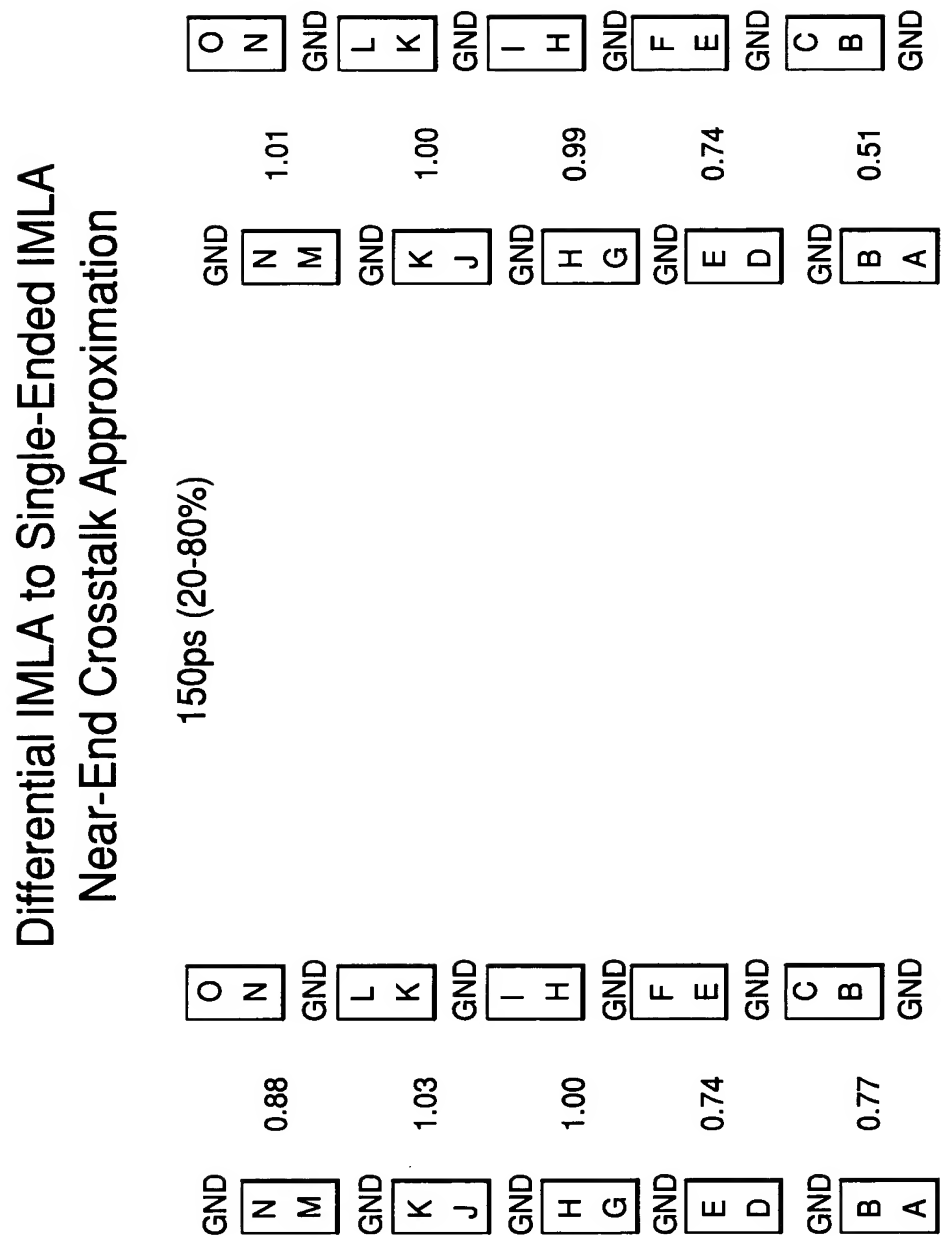
Differential IMLA to Single-Ended IMLA
Near-End Crosstalk Approximation
150ps (20-80%)
GND N M GND K J GND H G GND E D GND B A
0.88 1.03 1.00 0.74 0.77
O N GND L K GND I H GND F E GND C B GND
GND N M GND K J GND H G GND E D GND B A
1.01 1.00 0.99 0.74 0.51
O N GND L K GND I H GND F E GND C B GND

FIG. 46E

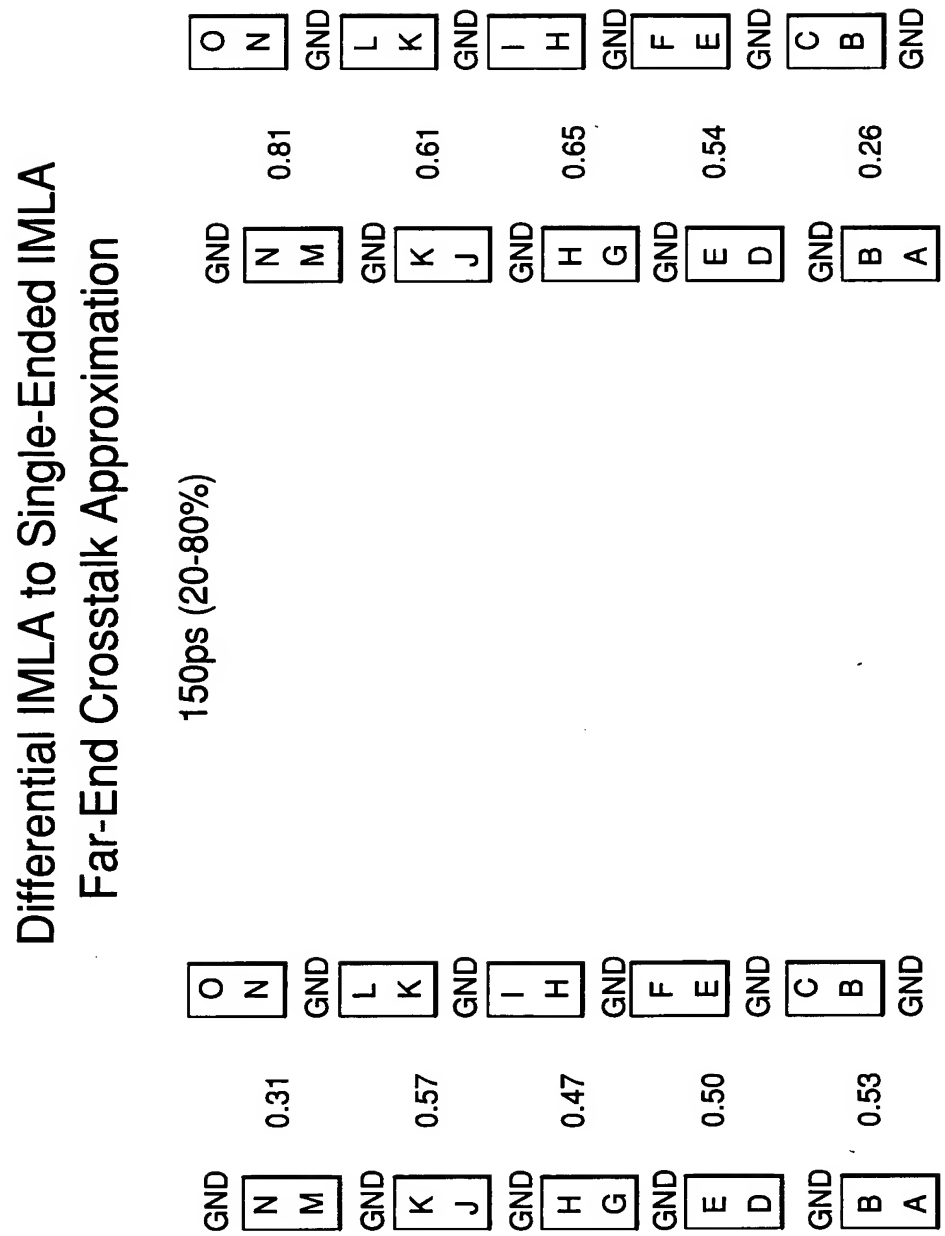
Differential IMLA to Single-Ended IMLA
Far-End Crosstalk Approximation
150ps (20-80%)
GND N M GND K J GND H G GND E D GND B A
0.31 0.57 0.47 0.50 0.53
O N GND L K GND I H GND F E GND C B GND
0.81 0.61 0.65 0.54 0.26
GND N M GND K J GND H G GND E D GND B A
O N GND L K GND I H GND F E GND C B GND

FIG. 46F